

ProStream[®] 9100

RELEASE 17.5.2

Software Guide

July 2016

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CAUTION: The Caution symbol calls your attention to information that, if ignored, can adversely affect the performance of your Harmonic product, or that can make a procedure needlessly difficult.



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NOTE: The Note symbol calls your attention to additional information that you will benefit from heeding. It may be used to call attention to an especially important piece of information you need, or it may provide additional information that applies in only some carefully delineated circumstances.



IMPORTANT: The Important symbol calls your attention to information that should stand out when you are reading product details and procedural information.



TIP: The Tip symbol calls your attention to parenthetical information that is not necessary for performing a given procedure, but which, if followed, might make the procedure or its subsequent steps easier, smoother, or more efficient.

In addition to these symbols, this guide may use the following text conventions:

Convention	Explanation
Typed Command	Indicates the text that you type in at the keyboard prompt.
<Ctrl>, <Ctrl>+<Shift>	A key or key sequence to press.
<i>Links</i>	The <i>italics in blue</i> text to indicate Cross-references, and hyperlinked cross-references in online documents.
Bold	Indicates a button to click, or a menu item to select.
ScreenOutput	The text that is displayed on a computer screen.
<i>Emphasis</i>	The <i>italics</i> text used for emphasis and document references.



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Chapter 1

Logging into ProStream 9100

Overview

To enhance the security of ProStream 9100, the device has two privilege levels that determine your right of access: Administrator and Monitor.

Each level can communicate with the device whether it is a web client or a Telnet session. Each level offers a different mode of work with the device. The following table lists the different privilege levels, the username / password combination and available working modes.

Username	Privilege Level	Password	Working Mode
Admin (configure)	Administrator	configure	Allows you to configure the device only via a web client and to define the monitor privilege level password.
Monitor (monitor)	Monitor	monitor	Allows you to monitor only the operation of the device.

The current access level appears in the upper right hand corner of the web client.



Full Device Configuration

The ProStream 9100 web client allows a full configuration of the device. It also allows you to monitor the ProStream 9100's status, view its alarms (if present), and troubleshoot them. This manual describes how to configure and monitor the device via the web client, accessible through a web browser.

Logging into the Device

To log in via a web client:

1. In a browser, type in the IP Management address of the required device.
2. Click **Login**.
3. Type in the required username and password.
4. To save the password, select **Remember my password**.
5. Click **OK**.

The web client page appears and you can start working with the device according to the permissions assigned to your privilege level.

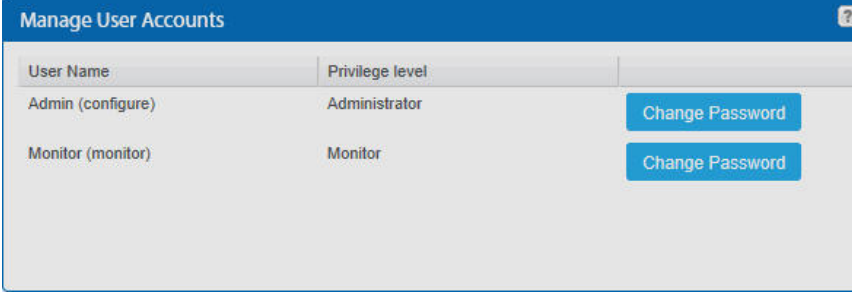
Changing a Password

If you logged in as Configure, you are authorized to change your password or the password of Monitor.

To change a password:

1. Select **Administration > User Management**.

The Manage User Accounts dialog box appears.

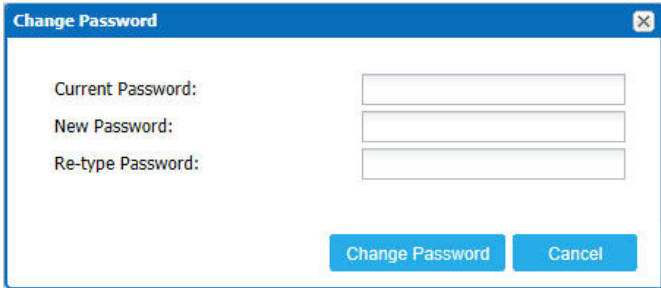


The 'Manage User Accounts' dialog box displays a table with two columns: 'User Name' and 'Privilege level'. It lists two users: 'Admin (configure)' with 'Administrator' privileges and 'Monitor (monitor)' with 'Monitor' privileges. Each user row has a 'Change Password' button to its right.

User Name	Privilege level	
Admin (configure)	Administrator	<button>Change Password</button>
Monitor (monitor)	Monitor	<button>Change Password</button>

2. Click **Change Password** corresponding to Admin or Monitor.

The Change Password dialog box appears.



The 'Change Password' dialog box contains three input fields labeled 'Current Password:', 'New Password:', and 'Re-type Password:'. At the bottom, there are two buttons: 'Change Password' and 'Cancel'.

Current Password:

New Password:

Re-type Password:

Change Password Cancel

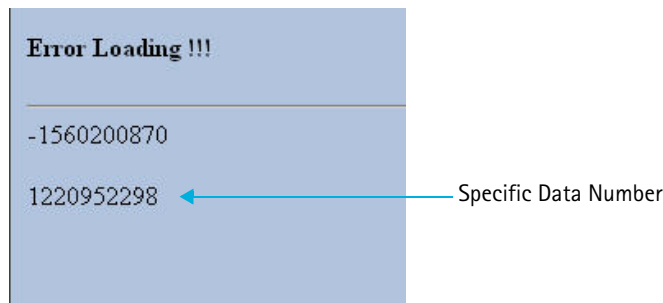
3. In **Current Password**, type the required password.
4. In **New Password**, type the new password.
5. In **Re-type Password**, re-type the new password.
6. Click **Change Password**.

The password is updated.

Restoring a Password

If you forget your current password, you can revert to the previous one.

After failing to log in three times, a message displaying a Specific Data Number appears. The Specific Data Number is generated with each failed login attempt.



To restore your previous password:

1. Contact Harmonic Customer Support and provide support personnel with the Specific Data Number.

Harmonic Customer Support personnel gives you a temporary password.

2. Open your browser, and type the following:

`http://<device IP address>/resetpass.htm`

3. Click **Go**.

The login dialog box appears

A screenshot of the Harmonic ProStream 9000 login dialog box. The box has a light blue background and a blue border. At the top, it says "harmonic" and "ProStream 9000". Below that, it says "Please Log in". There are two input fields: "Login" and "Password". Below the "Password" field is a checkbox labeled "Remember me". At the bottom, there are two buttons: "Log in" and "Cancel".

4. In **Username**, type `backdoor`.
5. In **Password**, type the password you received from Harmonic Customer Support.
6. Once you are logged in to the device, reset your password.

See [Changing a Password](#).

Chapter 2

Features and Specifications

Introduction

Harmonic ProStream 9100 is a highly integrated MPEG/DVB multiplexer Transcoder with internal processing cards, scrambler and descrambler, for multimedia services carried over digital broadcast networks. It features a modular, high-density chassis furnished with up to 5 IOMs (Input/Output Module) and up to 4 IPCs (Internal Processing Card) in a single one-rack-unit (1-RU) chassis. The platform's modularity allows easy field replacement of cards and HW/SW upgrades.

Main Features

The following table lists the main features of ProStream 9100. the unit functions as an encoder or as a transcoder, according to the installed IPC type.

Table 2-1: Main Firmware Related Features

Category	Feature	Description
Input and Output Interfaces	IP IOM	<ul style="list-style-type: none"> ■ Dual GbE card <ul style="list-style-type: none"> ■ Two independent ports per IP IOM ■ line rate of 1 Gbps per IP IOM ■ Maximum input and output bitrate is 500Mbps per IP IOM ■ Quad GbE card <ul style="list-style-type: none"> ■ 2 ports of 1Gbps, connector type RJ45 ■ 2 ports of 1Gbps, connector type SFP ■ 1port of 10 Gbps (port 2), connector type SFP+ ■ The ports can be used as 4 independent ports or 2 pairs of redundant ports (SFP to SFP and RJ-45 to RJ-45). Each pair can be configured separately, for example, one pair can be configured as redundant and one as independent. The transition between modes is not service affecting for the primary port ■ Input Transport Stream, both cards, per socket <ul style="list-style-type: none"> ■ Max Input Jitter - 50 msec. ■ Input frequency skew ± 30 PPM. ■ Delay - Typical: 500 msec Max: 900 msec. ■ Reordered packets are not supported.
	ASI SCR IOM	ASI-SCR - Up to four ports per IOM <ul style="list-style-type: none"> ■ Inputs and outputs DVB-ASI streams ■ Supports DVB-CSA scrambling ■ Synchronizes the device to an external clock coming from a GPS receiver ■ Bit rate: <ul style="list-style-type: none"> ■ Maximum output bitrate of 213Mbps ■ Maximum input bitrate of 210 Mbps ■ Supports packet size: 188 or 204 bytes
	8VSB	Up to four 8VSB input cards. See 8VSB Modulation .
Parsing Tables	Dynamic parsing of input	Extracts incoming feeds and displays their structure and elements on the control interface. It displays their bitrate, CC errors, SI PSI structure etc.

Table 2-1: Main Firmware Related Features

Category	Feature	Description
Redundancy	Input	<ul style="list-style-type: none"> ■ GbE port redundancy ■ Socket redundancy for each input socket ■ Service redundancy
Processing	Multiplexing/ provisioning options of the device	<ul style="list-style-type: none"> ■ Maximum processing bit rate of 500 Mbps ■ Full multiplexing (any input to any output) ■ Multicast of any input stream to multiple transport streams. ■ Multicast of services with different transcoding configuration ■ IP multicast - Supports IGMP ver 2/3 ■ Passing range of PIDs from any input to any output
	DiviTrack over IP	Statistical multiplexing - Combines rate shaping using external encoders
	DiviTrackMX (HW dependent, type of IPC)	Statistical multiplexing - Combines rate shaping using internal encoders
	Transcoding (HW dependent, type of IPC)	When transcoding modules are mounted: Transcodes incoming H264/MPEG2 programs and outputs them as H264/MPEG2 CBR/VBR services.
	Scrambling	<ul style="list-style-type: none"> ■ Supports the following scrambling algorithm: <ul style="list-style-type: none"> ■ DVB-CSA ■ AES-NSA2 - (IOM Cards only) ■ AES Fixed Key Control Word (CW) scrambling of outgoing TS over IP - For future use ■ BISS ■ Selective Encryption ■ Functions as scrambler and in AES-CBC scrambling mode, also as a de-scrambler. For future use only. ■ Supports PSIG MUX protocol ■ Supports ECMG redundancy ■ Internal EIS

Table 2–2: Main Firmware Related Features

Category	Feature	Description
Output Bitrate	Transcoding Bit Rate	<p>Video:</p> <ul style="list-style-type: none"> ■ VBR - In a pool ■ CBR - For HD up to 3 services per pool for best performances. <p>Audio:</p> <ul style="list-style-type: none"> ■ CBR only
Output Monitoring	TS Mirroring	<p>TS Mirroring - Duplicates each output TS (master) from any interface (IP, ASI) to any other TS (slave) in any interface. Supports all master functions such as: rate shaping, scrambling, RSS, tables generation, common PCR, PID range, DTolP.</p> <p>IP Mirroring - Enables you to duplicate all output data from one port (GbE1) of an IP IOM card to the other port (GbE2) of that card.</p>
Output Capabilities	SCT35 Insertion	Receives an SNMP trap from SL 10 and generates an SCT35 cue message
	Table Generation	<ul style="list-style-type: none"> ■ Create CAT ■ Create SDT ■ Create NIT
	Table Re-generation	<ul style="list-style-type: none"> ■ PSIP re-generation ■ EIT re-generation
	PID Prioritization	In case of Over subscription, the ProStream 9100 starts dropping PIDs according to their priority.
	PID Range	<p>Allows to pass a range of PIDs from any input to any output.</p> <p>Up to 16 PID ranges per unit.</p>
	Slate	Any service can be configured to have an alternative, or backup input feed or source that is enabled on the output upon disruption of the primary feed. It allows MSOs to inform their subscribers that they are doing anything possible to restore the service.
	Splicing	Allows cable headends and broadcast affiliates to insert locally-generated commercials and short programs into remotely distributed regional programs before they are delivered to home viewers.
	Emergency Alert System (EAS)	Enable MSO to automatically broadcast emergency alert messages through pre-configured channels.

Table 2–2: Main Firmware Related Features

Category	Feature	Description
PCR	Input PCR	The PCR can arrive on any input PID, such as video, audio or not on ES
	Output PCR	<ul style="list-style-type: none">■ The PCR can outflow on any PID. In transcoding, only over video PID■ Generate PCR (exceptions: Re-encoded or VBR Passthrough services, or with Common PCR on ES)■ Common PCR
Management	Management and monitoring interfaces	<ul style="list-style-type: none">■ Control Panel■ Web client■ NMX (Harmonic's Digital Service Manager)

Chapter 3

Configuring and Provisioning

Overview

Once the ProStream 9100 is cabled and set up in your network, you can configure, provision and monitor the device through the web client. The web client reads data from the device and presents it in a user interface (UI) called the Standalone GUI (SAG).

This chapter describes how to configure the inputs and multiplex a ProStream 9100 standalone model using the web client.

Web Client Page

The web client page includes the following sections:

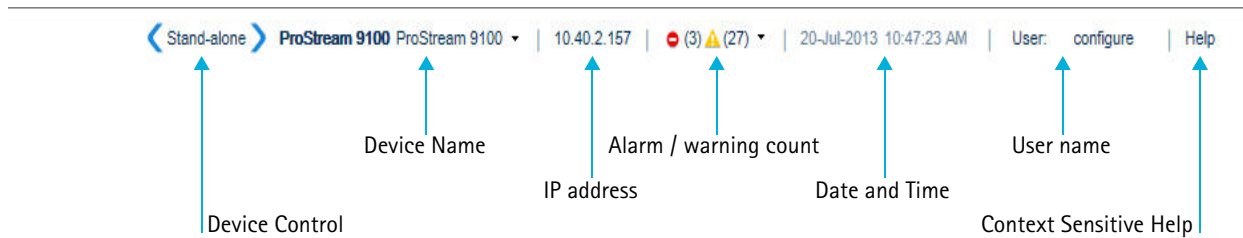
- [Status Bar](#)
- [Management Panes](#)
- [Active Alarms Tab](#)

The screenshot shows the ProStream 9100 Standalone GUI (SAG) web client interface. The interface is divided into several sections:

- Physical Inputs pane:** Displays input ports and their status. It includes a search bar and a list of ports with their respective data rates.
- Logical Inputs pane:** Displays logical input streams and their status. It includes a search bar and a list of streams with their respective data rates.
- Logical Outputs pane:** Displays logical output streams and their status. It includes a search bar and a list of streams with their respective data rates.
- Physical Outputs pane:** Displays output ports and their status. It includes a search bar and a list of ports with their respective data rates.
- Status bar:** Located at the top right, it displays system information such as the device name (ProStream 9100), IP address (10.47.102.104), and user information.
- Active Alarms tab:** Located at the bottom, it displays a table of active alarms with columns for Fault Object, Description, Asserted Time, Severity, and Recovery Tip.

Fault Object	Description	Asserted Time	Severity	Recovery Tip
1. Card	Gbe-4G Card Voltage Error	20-Aug-2015 12:43:06 PM	Warning	Replace the device that issued the alarm.
2. Program 1 (Srv_1) of TS ID 0	License DVB Scrambling Missing	20-Aug-2015 12:42:29 PM	Critical	Install missing licenses.
3. Device	License Grace Enabled [42 Remaining Days]	20-Aug-2015 12:42:22 PM	Warning	Install the missing licenses.

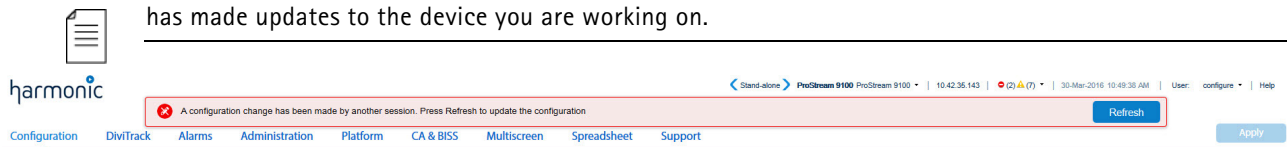
Status Bar



The Status bar comprises:

- <device control> - The default is Standalone. When the device is managed through NMX, **NMX** is displayed instead.
- Device name drop-down list:
 - Properties - Shortcut to **Platform > HW Inventory** submenu.
 - Identify Unit - Set to **On** to blink the lights on the front panel to locate the unit in a rack.
- IP Address - The management IP address.
- Alarm and Warning Count drop-down list - Click to display a list of the active alarms and warnings
- Device date and time
- User - Displays the username, configure or monitor, of the logged in user
- Context Sensitive Help

NOTE: The following warning message may appear between the Status bar and Tabs when another user has made updates to the device you are working on.



Management Panes

ProStream uses four management panes:

- Physical Inputs pane - Enables control and monitoring of the device's physical input interfaces. See [Both *Physical Inputs* and *Logical Inputs* panes provide information on the input stream.](#)
- Logical Inputs pane - Enables control and monitoring of the input stream. See [Logical Inputs Pane](#).
- Logical Outputs pane - Enables control and monitoring of the output stream.
- Physical Outputs pane - Enables features of the device's physical output interfaces.

Right-click or double-click any object to see its drop-down menu or options (if available). To identify elements, SAG uses a wide range of icons. See [Stream Configuration Page Conventions](#).

Active Alarms Tab

All current warnings and alarms are displayed in this pane together with a description, date and time, the level of severity and a recovery tip.

ProStream Monitoring

Monitoring the ProStream operation involves checking alarm indicators displayed in the title bar of each of the available web client pages. The Alarm indicator is also a link to the Alarm page and provides the following information:

Table 3–1: Alarm Indicators

Alarm Indication	Explanation
Green Alarm	No active alarms.
Red Alarm	There is at least one active alarm. Hovering your mouse over the alarm icon in the Inputs/Outputs panes displays a tooltip with a description of the alarm. Double-clicking the icon displays its properties.
Orange Warning	There is at least one active warning. Hovering your mouse over the warning icon in the Inputs/Outputs panes displays a tooltip with a description of the warning. Double-clicking the icon displays its properties.
(N) Active Alarms	'N' stands for the number of registered alarms. Click the link to open the Alarm page.

Stages of ProStream Configuration

Configuring the ProStream standalone model involves the following stages:

- ProStream Platform Parameters - Configure Ethernet ports, slots and ASI port direction. You can view chassis and GbE port parameters and define various global settings of the device.
- ProStream provisioning - During this stage you may read information from the device and then multiplex it. Multiplexing is done mainly from the Configuration page and includes the following stages:
 - Input configuration - On the Physical Inputs pane, enable input ports. For GbE input ports, set port and socket parameters. On the Logical Inputs pane, associate the input with and control and monitor the input stream.
 - Read data from the device (optional) - The web client displays the updated data as read from the device.
- Output configuration and multiplexing - On the Logical Output pane, using a GbE port, set port and socket parameters, TSs, services, and PIDs parameters.
- Scrambling/Descrambling - When ProStream functions as a scrambler/descrambler, on the Logical Output pane, set communication parameters to enable communication between the device and the Conditional Access System (CAS). You can also view other CAS parameters such as SCG, ECM and EMM parameters.

When ProStream functions as a descrambler using the AES protocol, set the CWS parameters. For future use only.

- Transcoding - When ProStream functions as a re-encoder, set the re-encoding parameters via the Transcoding section.
- Physical output configuration - On the Physical Outputs pane, arrange the output content (multiplexing), set output port parameters and enable the port.

Before you Begin

Before you start configuring and provisioning the device, note the following:

- Greyed-out fields are for viewing only.
- To change parameter values, click inside a field and type the required values. Clicking outside the field updates the web client interface and displays the new parameters. Note the following web page options:
 - ❑ Clicking **OK** saves the new configuration and closes the web page dialog box. The new configuration is not applied to the device.
 - ❑ Clicking **Save** saves the new configuration and keeps the web page dialog box open. The new configuration is not applied to the device.
 - ❑ Clicking **Apply** saves the new configuration and applies it to the device.
 - ❑ Clicking the **Close** box at the upper right corner of the browser closes the web page without saving the configuration.
- To delete rows in a table, select the **Select** check box and then click **Delete/Remove**.

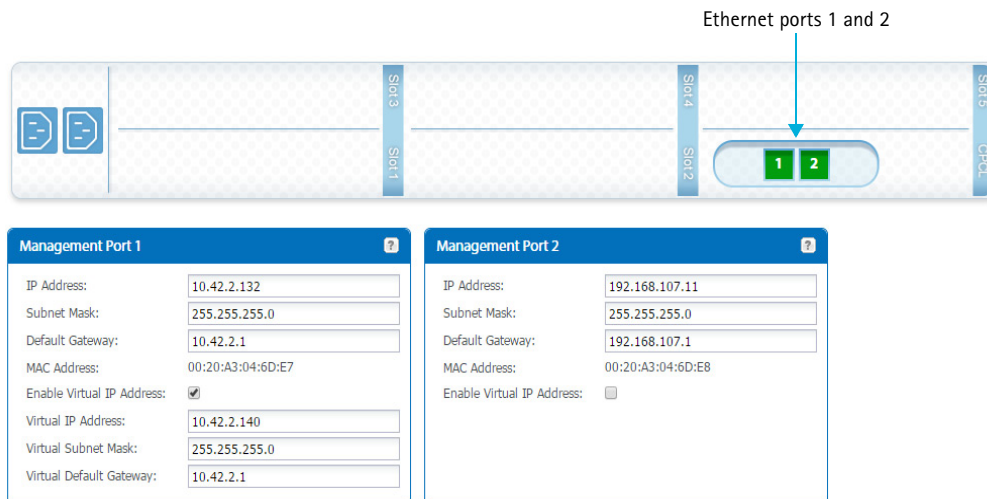
Platform Parameters

Configure the platform parameters when you start the device configuration. Usually it is a one time procedure that you do via the Platform page. The Platform page includes the following:

- Graphical view of the ProStream back panel - Selecting a component displays a table that includes its parameters. The table enables you to configure and view various parameters.
- Navigation pane - Enables access to various platform related features:
 - ❑ Firmware Upgrade
 - ❑ HW Inventory
 - ❑ Management Port
 - ❑ Backup/Restore
 - ❑ DPI
 - ❑ EAS
 - ❑ Device Redundancy
 - ❑ ESAM

Setting ETH1 and ETH2 Port Parameters

The IP address of the ETH1 port or ProStream primary IP address is configured as part of the ProStream installation (see ProStream 9100 Installation Guide). However, when required, you can change the IP address settings.



To change the ETH port configuration:



NOTE: Configure the IP address of ETH1 on a different subnet than that of ETH2. Configuring both ports to be on the same subnet could cause serious network communication problems. ProStream uses the ETH1 port to communicate with the network for management purposes and ETH2 for Conditional Access Systems (CAS) purposes.

1. Select **Platform > Management Port**.

The page opens and ETH1 and ETH2 are indicated.

2. In Management Port 1 and Management Port 2, set the network properties for each port, as follows:
 - ☐ IP Address
 - ☐ Subnet Mask
 - ☐ Default Gateway

You can view the MAC address of the port.



NOTE: The MAC address is the physical address of the interface. The address is retrieved and presented in the Platform page for viewing purposes only.

3. Click **Apply** to apply changes.
4. If you configured ETH1, log in to the new IP address.
5. Select **Enable Virtual IP Address** and then enter:
 - ☐ Virtual IP Address
 - ☐ Virtual Subnet Mask
 - ☐ Virtual Default Gateway



NOTE: The Virtual IP Address is only available for Quad GbE cards not in Hot:Hot redundancy mode.

Viewing/Setting Platform Parameters

To set Platform Parameters:

1. Select the **Platform > HW Inventory**.
2. Click in the general area.

The Platform Properties and Midplane panes appear.



3. In the **Platform Properties** list, view/configure the following chassis parameters:

Platform Properties	
Device Model:	ProStream 9100
Firmware Version:	10.4.0.0.477
Device Name:	<input type="text"/>
Part Number:	PRM-9100-CHS-AC 03
Serial Number:	053022782
Power Supply:	Dual
<input type="button" value="Reboot"/>	

- ❑ Device Model - Indicates the device model.
 - ❑ Firmware Version - Indicates the firmware version.
 - ❑ Device Name - Type the device name into the field.
 - ❑ Part Number - Indicates the part number of the chassis.
 - ❑ Serial Number - Indicates the serial number of the chassis.
 - ❑ Power Supply - Indicates whether the device has a single or dual power supply
 - ❑ Reboot - Enables a device reboot.
4. In the **Midplane** list, view/configure the following chassis parameters:

Midplane	
Part Number:	095-0283-001F
HW Revision:	3.1

- ❑ Part Number - Displays the customer part number.
- ❑ HW Revision - Indicates the HW revision.

Viewing/Setting Card Parameters

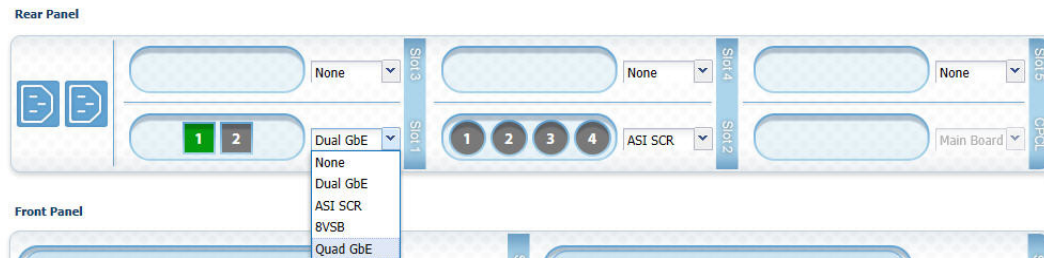
To set the card parameters:

1. Select **Platform > HW Inventory**.
2. Select the required slot.

The slot presents the card in the slot. You can select the required card and assign it to a slot for a future configuration.

3. To configure the slot, click the drop-down list and select the required card:

- ❑ None - No IOM card in the slot
- ❑ Dual GbE card - GbE 1G IOM card
- ❑ ASI SCR - ASI IOM with scrambling support
- ❑ 8VSB card. See [8VSB Modulation](#)
- ❑ Quad GbE card - GbE 4G IOM card



NOTE: GbE and Quad GbE IOMs can be located only in slots 1 or 2.

When you select a card from the drop-down list, the card is displayed in the slot.

4. In the message that appears, do one of the following:
 - ❑ Click **Yes** - Physical inputs and outputs (physical sources and destinations) and logical TSs are removed.
 - ❑ Click **No** - Physical inputs and outputs are removed without associated TSs.

Viewing Card Properties

To view card properties:

- Select **Platform > HW Inventory** and then click the required card.

The **IOM Slot # Card Information** table is updated to display the following:

- ❑ ASI SCR IOM card - View or set the required port direction.



Click the card number to view its properties

- ❑ Quad GbE card - In the **IOM Slot # Card Information** section, view the information as shown in the following figure:

IOM Slot 2: Card Information	
Card Type:	Quad GbE
Part Number:	095-0217-001F
Serial Number:	052442269
HW Revision:	0A
FPGA Version:	

- ❑ Dual GbE card - In the **IOM Slot # Card Information** section, view the information as shown in the following figure:

IOM Slot 1: Card Information	
Card Type:	GbE Pro
Part Number:	095-0221-004F
Serial Number:	052484025
HW Revision:	04
FPGA Version (In):	0x424
FPGA Version (Out):	0x1020005
Firmware Version:	1.19.8
EPLD Version:	0x17

- ❑ 8VSB card and ASI card - In the **IOM Slot # Card Information** section, view the information as shown in the following figure:

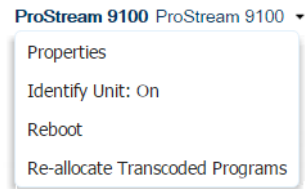
IOM Slot 5: Card Information	
Card Type:	ASI SCR
Part Number:	
Serial Number:	
FPGA Version:	0xFFFFFFFF

Global Platform Configuration

Identifying the Unit

To identify the unit:

1. In the Status bar, click the device name drop-down list and select **Identify Unit**.



2. If **Identify Unit** is set to **Off**, click to toggle the front panel lights to **On**.
The lights on the device's front panel blink to indicate the unit in a rack.

Resetting the unit

To reset the unit:

1. In the Status bar, open the device name list and click **Reboot**.
2. In the Confirmation message that appears, click **Yes**.

The device reboots.

Accessing Platform Parameters

To access the platform parameters:

- In the Status bar, open the device name list and click **Properties**.

The **Platform** page appears.

Managing Software

The **Software Management** page, located under **Platform > Firmware Upgrade**, enables you to do the following:

- Transfer and install an updated version
- Change the running software - Up to two versions of the firmware package can reside on the ProStream device. Usually, these are the currently installed version and the earlier installed version. You can change the running firmware as required.

The screenshot displays three distinct sections for firmware management:

- Activate Installed Firmware:** This section includes a label 'Active Firmware:' with the value '10.4.0.0.484', a 'Select Firmware:' dropdown menu also showing '10.4.0.0.484', and an 'Activate' button.
- Install New Firmware:** This section features a 'Select File:' label, an empty text input field, a 'Browse...' button, and two buttons at the bottom: 'Install' and 'Install and Activate'.
- Manage Installed Firmware Versions:** This section contains a 'Select Firmware:' dropdown menu with 'None' selected and a 'Delete' button.

Activate Installed Firmware

To activate the installed firmware:

- In the Activate Installed Firmware section, click **Activate**.

To replace installed firmware:

1. Click the **Select Firmware** drop-down list and select the required firmware.
2. Click **Activate**.

Transfer and Install an Updated Firmware Version

To transfer and install an updated firmware version:

This screenshot shows the 'Install New Firmware' section, which includes a 'Select File:' label, an empty text input field, a 'Browse...' button, and two buttons at the bottom: 'Install' and 'Install and Activate'.

1. In the Install New Firmware section, click **Browse** and navigate to the updated firmware.

The file is displayed in the field.

The file name is in the following format: xx.xx.xx.xxx and does not have an extension.

2. Click one of the following:
 - ❑ **Install** - Transfers the firmware file to the device.
 - ❑ **Install and Activate** - Transfers and installs the firmware on the device.

A message appears notifying you that the transfer takes a few minutes.

3. Click **OK**.

The selected firmware is transferred and installed on the device. Progress bars and flashing messages appear indicating the stages and progress of the version transfer and installation.



CAUTION: During the transfer, do not close the web browser and do not reset the device. Either action can cause the device to hang without a valid firmware for booting up.

When the transfer is complete, a message appears asking if you want the device to run with the newly transferred version.

4. Click **OK**.

A message appears asking if you want to reset the device.

5. Click **OK** to reset and run the device with the newly transferred version.

A message appears asking if you want to close the web client.

6. Click **Yes** to close the web client page.



NOTE: If you click **No**, the web client page stays open during reset, but it cannot read data from the device to display updated information.

7. Wait a few minutes until reset is complete and open the web client page.

To manage (delete) installed firmware versions:

1. In the Manage Installed Firmware Versions, do one of the following:
 - ☐ Click the **Select Firmware** drop-down list and select the required version.
 - ☐ Click **Delete**.




























































NOTE: You can have up to three software versions loaded on the device.



























Stream Configuration Page Conventions

The following figures show the main icons used in the Configuration page.





























PID Related icons

Type	Clear (FTA)	Scrambled	Descrambled	PID Missing
Video				
AVC				
M2				
HEVC				
Audio				
DPI				
TXT				
Data				
Ghost	?	N/A	N/A	? 
EMM		N/A	N/A	
ECM		N/A	N/A	
PCR				
PCR on Vid				
PCR on Audio				
RSS				
Program				

Program and Table related icons

Item	Normal	Disabled	Missing
Table			
Tables (Container)			
Program	See above	N/A	See above
Re-encoding			
Video TX			
Audio TX			
TS			
Pool			N/A
icons for encoding	Same as ES	N/A	Same as ES
MBTS			N/A
MW Profile		N/A	N/A
Descriptor		N/A	N/A
SCG		N/A	N/A
Network		N/A	N/A

Port related icons

Port	Enabled	Disabled
ASI		
RF		
RJ-45		
1G RJ-45		
10G RJ-45		
100BT RJ-45		
RS232		
SFP 1G		
SFP 10G		
SFP 40G		
DVB-T or 8-VSB		
Socket		
Sockets Container		
Tables Container	Tables	Tables
Cards		



NOTE: GbE input/output port must be configured before provisioning services through the port.

Configuring Input Ports

ProStream devices can include GbE and/or ASI input ports. Each port can be individually enabled or disabled.

The **Configuration** page contains the Physical Inputs and Logical Inputs panes for configuring input ports.

The Input port configuration consists of the following stages:

- Set port mode - Applicable only to GbE ports.
- Enable/disable ports - Applicable to all types of input ports.
- Set port parameters - Applicable to GbE ports only.
- Set socket parameters - Applicable to GbE ports only.
- Read the current information from the input ports (optional).

Setting the GbE Port Mode

Pairs of ports—1 & 2 and 3 & 4—can work independently or in one of four redundancy modes, described in the following table.

Table 3–2: GbE Input Redundancy Modes

Parameter	Explanation
Manual	The redundancy switch is performed manually. The Active Port parameter appears and you can set the active port.
Automatic	The redundancy switch is performed automatically upon port failure. If the primary port fails, the device automatically switches to the backup port. The backup port continues receiving content unless it too becomes faulty. The device switches to the primary port only when the backup fails.
Manual Revert	The redundancy switch is performed automatically upon port failure. However, switching back to the primary port after it has been stabilized, is performed manually. To revert to the primary port, change Port Usage to Automatic. Once the primary port is active, change Port Usage to Manual Revert.
Automatic Revert	The redundancy switch is performed automatically upon port failure. The device automatically switches back to the primary port when the primary has stabilized and even though the backup is still in working order.



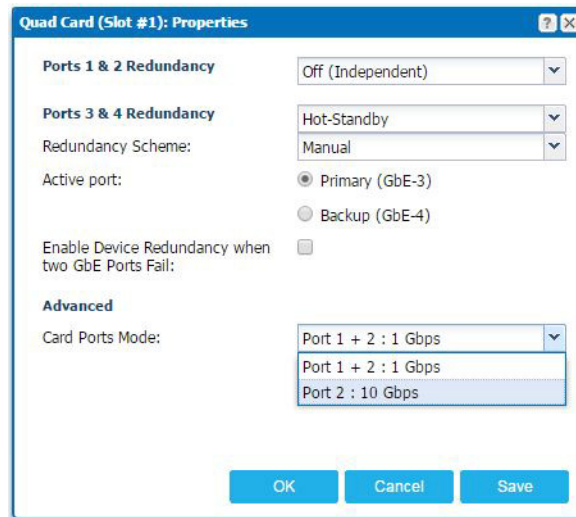
NOTE: By default, port 1 is the primary port and port 2 of the same IOM is the backup port.



NOTE: Triggers for a port redundancy switch include: Missing PID, Zero Bitrate (Cable Disconnect, Socket Loss), PAT/PNT Missing, CC Error.

To set a GbE port mode:

- In the **Physical Inputs** pane, right-click a slot with a GbE card and select **Properties**.
The **Properties** dialog box appears.



The image shows a dialog box titled "Quad Card (Slot #1): Properties". It contains several configuration options:

- Ports 1 & 2 Redundancy:** A dropdown menu set to "Off (Independent)".
- Ports 3 & 4 Redundancy:** A dropdown menu set to "Hot-Standby".
- Redundancy Scheme:** A dropdown menu set to "Manual".
- Active port:** Two radio buttons: "Primary (GbE-3)" (selected) and "Backup (GbE-4)".
- Enable Device Redundancy when two GbE Ports Fail:** An unchecked checkbox.
- Advanced** section:
 - Card Ports Mode:** A dropdown menu with three options: "Port 1 + 2 : 1 Gbps", "Port 1 + 2 : 1 Gbps", and "Port 2 : 10 Gbps". The second option is currently selected.

At the bottom of the dialog box are three buttons: "OK", "Cancel", and "Save".

Pairs of ports (1 & 2 and 3 & 4) can work independently or in one of four redundancy modes.

The ports are configured as follows:

- Open the appropriate **Ports #s Redundancy** drop-down list and select one of the following:
 - ☐ Off (Independent)
 - ☐ Hot-Standby
- If **Manual** redundancy is used, select the port to be Primary or Backup.
- In the **Advanced** area, click the **Card Ports Mode** drop-down list and select one of the following:
 - ☐ Port 1 + 2 : 1 Gbps
 - ☐ Port 2 : 10 Gbps

Configuring Input ASI Cards

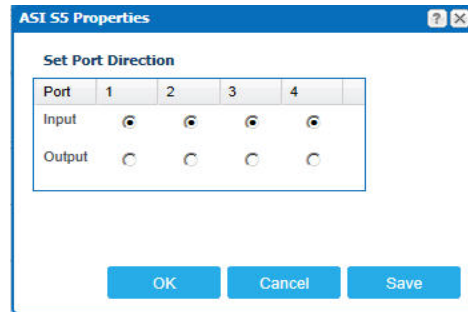


NOTE: Prior to configuration, define whether the ASI port is an input port or output port.

To configure Input ASI cards:

- In the **Physical Inputs** pane, right-click a slot with an ASI card > **Properties**.

The **ASI Properties** dialog box appears.



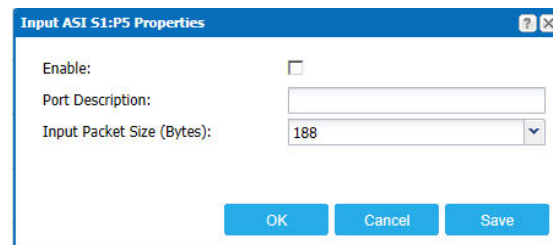
2. Select the required direction.

See also [Viewing/Setting Card Parameters](#). By default the port is an input port.

Configuring Input ASI Ports

To configure Input ASI Ports:

1. In the **Physical Inputs** pane, right-click an ASI port and select **Properties**.



2. Select **Enable**.
3. In **Description**, edit the default description.
4. Click the **Input Packet Size** drop-down list and select the required packet size.

You can select 188 (default), 204 or Auto. In you select Auto, ProStream detects the packet size automatically.

In case of scrambling over ASI, you can only select 188 (default) or 204.

Configuring Input GbE Ports

To configure Input GbE Ports:

1. In the **Physical Inputs** pane, expand the GbE card list.
2. Right-click a slot with a GbE card and from the popup menu, select **Properties**.

The **GbE Port Properties** dialog box appears.

GbE Port #1 (Slot #1) Properties

Enabled:	<input checked="" type="checkbox"/>
Description:	<input type="text"/>
Max Speed (Gbps):	1
IP Address:	105.112.101.121
Subnet Mask:	255.255.255.0
Gateway:	105.112.101.1
MAC Address:	00:20:A3:23:16:A8
IPv6 Link-local address:	FE80:0:0:0:220:A3FF:FE23:16A8/64
IPv6 Global address 1:	2001:DB8:D0:101:220:A3FF:FE23:16A8/64
Enable Virtual IP Address:	<input type="checkbox"/>
Autonegotiation:	<input type="checkbox"/>
Shutdown Port When Input is Missing:	<input checked="" type="checkbox"/>
Shutdown Port Stabilization Time:	1

Port Redundancy

Redundancy Mode:	Off (Independent)
------------------	-------------------

SFP Information

Vendor:	Not Mounted
Speed (Mbps):	1000
Type:	Not Mounted

Routing Information

OK Cancel Save

3. Select **Enabled**.
4. In **Description**, edit the default description.
5. Configure and view the port parameters according to the following:
 - ☐ Max Speed (Gbps) - View the maximum speed of the port, whether 1 Gbps or 10 Gbps.
 - ☐ IP Address - Type in the required IP address.
 - ☐ Subnet Mask - Type in the required subnet mask.
 - ☐ Gateway - Type in the IP address of the gateway.
 - ☐ MAC Address - (Read only) View the physical address of the GbE as retrieved from the device.
6. Select **Enable Virtual IP Address** to display the following information.
 - ☐ Virtual IP Address
 - ☐ Virtual Subnet Mask
 - ☐ Virtual Default Gateway



NOTE: The Virtual IP Address is only available for 4 GbE cards not in Hot:Hot redundancy mode.

7. Select **Autonegotiation** to engage this handshake protocol used in GbE links.



TIP: Select Autonegotiation only if the other end of the GbE link also uses autonegotiation.

8. Select **Port Shutdown when Input is Missing** to shift the port to Link Down when no stream is detected at the port after the interval specified in the Port Shutdown Stabilization Time field is reached.



NOTE: The Port Shutdown Stabilization Time field automatically appears on the port properties page when the Port Shutdown when Input is Missing is selected.

9. Enter the value for the **Port Shutdown Stabilization Time** field (Range: 1 to 20 seconds, default is 1).



NOTE: Once a stream is detected, the port automatically shifts to Link Up.

10. If you are using port 3 or port 4, select **Loopback**.
11. Click the **Port Redundancy** drop-down list to select a redundancy mode.

See [Setting the GbE Port Mode](#).

12. **SFP information** displays the following as read-only on ports 1 and 2:
 - ☐ SFP Vendor
 - ☐ SFP mode
 - ☐ SFP type - Can be either SX - Usually used for short distances (up to 200 m) or LX - usually used for long distances (10km and up).
13. Expand **Routing Information** and provide the following information:
 - ☐ IP Address 1
 - ☐ Subnet Mask 1
 - ☐ IP Address 2
 - ☐ Subnet Mask 2

Socket Configuration

Content transmission of Video-over-IP utilizes sockets. Each socket is a terminal for a TS. The socket is defined by a unique combination of destination IP address and UDP port.

You can add up to 128 sockets with up to eight MPTS (Multi Protocol Transport Services) sockets. Each MPTS socket may stream up to 32 services.



NOTE: To change the socket type (SPTS, MPTS), delete the socket and reconfigure with the new socket type.

You can add sockets one by one or multiple sockets in one step. In addition, you can delete sockets at any time.

Socket IP Address

When defining the IP address of a socket, use the information provided in the following table.

Table 3–3: Sockets

Type	Class	Available Range
Unicast	A	1.0.0.0 - 126.255.255.255

Table 3–3: Sockets

Type	Class	Available Range
Unicast	B	128.0.0.0 - 191.255.255.255
Unicast	C	192.0.0.0 - 223.255.255.255
Multicast	D	224.0.0.0 - 239.255.255.255



NOTE: The following reserved ranges should not be used:
Reserved 224.0.0.0 - 224.0.0.255. Reserved for administration 239.0.0.0 - 239.255.255.255

Adding a Socket

To add a socket:

1. In the **Physical Inputs** pane, expand a slot with a GbE card.
2. Expand the port to display **+ New Socket**.
3. Click **New Socket**.



NOTE: Alternatively, you can right-click on the port and click **Add New**.

Configuring a Socket

To configure a socket:

1. In the Physical Input pane, right-click the required socket and click **Menu**.
2. From the Menu select **Properties**.

The **Input Sockets Properties** dialog box appears.

Input Socket 52:P3, [239.205.50.1] Properties

Socket Description :

IP Type: Multicast

IP Version: IPv4

IP Address: 239.205.50.1

Encapsulation Mode: UDP

TCP/UDP Port: 2000

De-Jittering

Source Specific Multicast

☒ IP Address

Add Remove

OK Cancel Save



NOTE: The Input Socket dialog box can be populated with vertical scroll bars. Scroll the vertical scroll bar to view all socket properties.

3. **Socket Description** - Enter a description of the socket to easily identify the socket.
4. **IP Type** - Click the drop-down list and select a Unicast address or a Multicast IP address.
5. **IP Version** - Click the drop-down list and select IPv4 or IPv6.
6. **IP Address** - Type an IP address as described in [Socket IP Address](#).
7. **Encapsulation Mode** - Click the drop-down list and select one of the following:
 - ☐ UDP - According to the transmitter/receiver
 - ☐ RTP - According to the transmitter/receiver. If FEC is used, select RTP
 - ☐ H RTP - To receive a socket encapsulated in Harmonic RTP to allow connection between ProStream 9100 devices.
 - ☐ DTolP - DiviTrack over IP.
8. **TCP/UDP Port** - Enter a port number. The available range is 1- 65535.
9. Expand **De-Jittering** and select one of the following from the **De-Jittering Mode** drop-down list:
 - ☐ No De-Jittering
 - ☐ Data
 - ☐ CBR
 - ☐ VBR
 - ☐ External Statmux
 - ☐ Delay - For Data only, select the required delay. For CBR and VBR modes, the delay is set at 500 ms.
10. In the **Average Input Bitrate (Mbps)** field, move the Up/Down arrows to select the required bitrate.
11. Expand **Source Specific Multicast** and set a specific multicast source for the input and manage the list using the **Add** and **Remove** buttons.

Duplicating a Socket or Multiple Sockets

The following table lists the available methods for duplicating a socket.

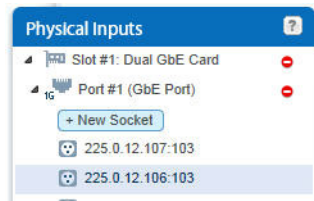
Table 3–4: Duplicating a Socket

Button	Explanation
Increment IP	Adds a single socket with the last socket configuration with an incremented IP address
Increment Port	Adds a single socket with the last socket configuration with an incremented port number
Range	Adds a range of sockets

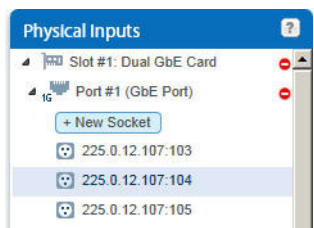
To duplicate a socket:

1. In the **Physical Inputs** pane, right-click the required socket and click **Menu**.
2. Do one of the following:

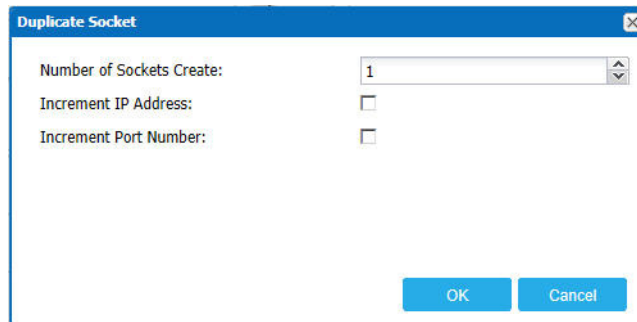
- Add by incrementing IP - From the menu select **Duplicate > Increment IP**.
A socket is added with an incremented IP address.



- To add by incrementing a port - From the menu select **Duplicate > Increment Port**.
A socket is added with an incremented Port address.



- To add by adding a range - From the menu select **Duplicate > Range**.

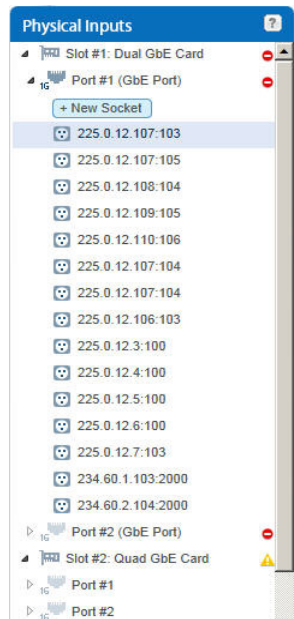


- Number of Sockets Create - Select the number of sockets to create.
- Increment IP Address - Select if the range is with an incremented IP address.
- Increment Port Number - Select if the range is with an incremented port number.

Input Information (Extraction)

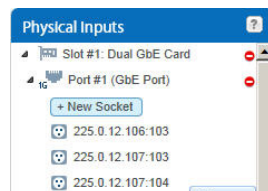
Both **Physical Inputs** and **Logical Inputs** panes provide information on the input stream.

Physical Inputs Pane. The **Physical Inputs** section provides a general view of the input stream. You can drill down any physical input component, slot, card and port to view the components. The following figure shows drilled down physical inputs. The Physical Inputs section also indicates the slot number and type of mounted card.



To drill down a component:

- Click the required component to expand it and view its properties.



Logical Inputs Pane

The Physical Inputs pane shows the input streams that are carried by each port listed in the pane. The streams in the Logical Inputs pane can be added to the TS programs in the Logical Outputs pane.

There are three view options.



- Program View
- Table View
- PID View

Each transport stream is represented in an expandable panel. The panel header shows:

- TS name
- Source IP address
- Total bandwidth in Mbps
- Alarm indicator when any element in the TS has an alarm state

Expand each TS panel to view:

- Each program carried in the TS
- Elementary streams in each program
- Unreferenced PIDs
- Alarm indicator for the individual ES and the program that carries it

Customize the view to configure programs, tables, or PIDs. The default view is Program view. In any view you can right-click on any object to see the drop-down menu options.

TS Extraction

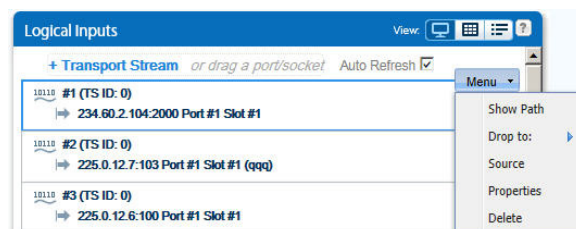
In the Logical Inputs pane, the drop-down menu contains the following options:

- Show Path - The Physical Inputs pane is updated to show the path of the TS.
- Drop to - Enables you to move to the required logical output.
- Source - Shows the input source in the Physical Inputs pane.
- Properties - Opens the Properties page.
- Delete - Allows you to delete the TS.

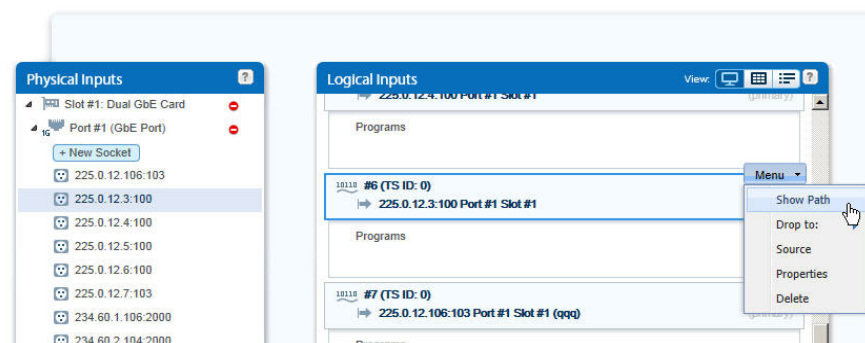
Showing the Path

To show the path:

1. In the Logical Inputs pane, hover over the TS section to display the **Menu** drop-down list.
2. From the drop-down list, select **Show Path**.



The Physical Input pane is updated to show the path of the TS:

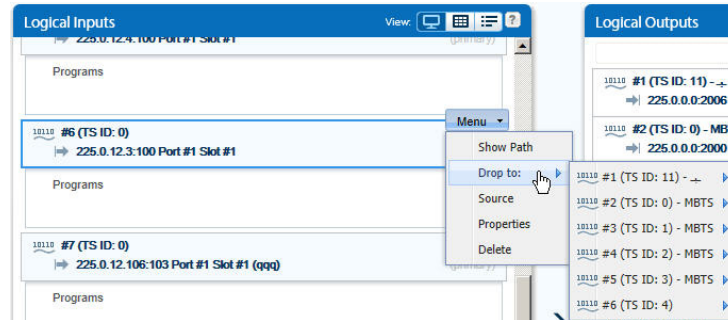


Moving the TS to an Output

To move the TS to an Output:

1. In the Logical Inputs pane, hover over the TS section to display the **Menu** drop-down list.
2. From the drop-down list, select **Drop To**.

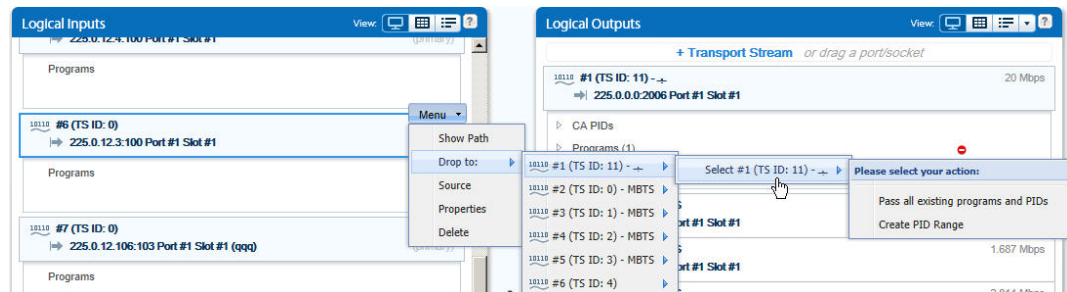
A menu with the available Logical Outputs TSs appears.



3. Select the required Logical Outputs TS.

The Logical Outputs TS shows the TS that you can select.

4. Select the TS and from the sub-menu, select one of the following:
 - ☐ Pass all Existing programs and PIDs
 - ☐ Create PID range



Transport Stream Source

To configure the source of the TS:

1. In the Logical Inputs pane, hover over the TS section to display the **Menu** drop-down list.
2. From the drop-down list, select **Source**.

The Input TS Sources dialog box appears. (Content depends on chosen options in the Input TS Sources window - Use for instance Manual Revert to get the following window)

The **Primary Source Port** is read only.

To configure the input redundancy, see [Input TS Protection](#).

Backup configuration

If Enhanced Redundancy or a redundancy scheme is selected, configure the backups.

To configure a backup:

1. Select the backup Port/Socket for each backup used.
2. Click **MPEG Sync Loss (Socket Failure)** and select the number of seconds (1-65).
3. If **CC Errors** is selected, set:
 - ☐ Number of errors (1-1000000)
 - ☐ Number of seconds (1-159)
4. Set the **PAT Missing**, **PMT Missing** and **PIDs Bitrate Underflow** alarms with the appropriate number of seconds each.
5. Select **Scrambled A/V** if the transport stream is scrambled.

TS Properties

To configure the transport stream properties:

1. In the Logical Inputs pane, hover over the TS section to display the **Menu** drop-down list.
2. From the drop-down list, select **Properties**

The Input TS Properties dialog box appears.

3. TS ID - View the TS ID.
4. Description - Type a short description.
5. Report CC Errors Alarm - To show Continuity Counter errors, select one of the following options:
 - ☐ Always
 - ☐ Never
 - ☐ If PID is Passed
6. Click to **Reset Counters**.
7. Check the **Eligible for Slate** check box to make a TS available for Slate configuration.

The following parameters can only be viewed:

- ☐ Bitrate
- ☐ Padding
- ☐ Effective Rate
- ☐ CC Errors



NOTE: Clicking **Reset Counters** resets Bitrate and CC Errors to zero.

Program Extraction

To configure program extraction:

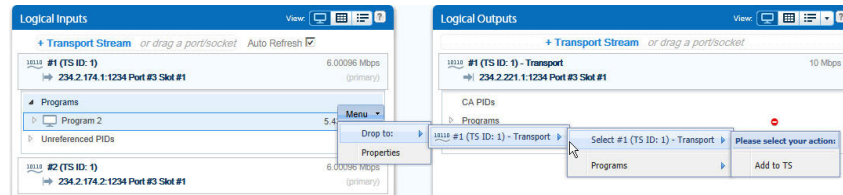
1. In the Logical Inputs pane, select the required program to display the **Menu** drop-down list.
2. From the drop-down list, select one of the following options:
 - ☐ Drop to - Enables you to move the required program to a logical output.
 - ☐ Properties - Opens the Properties page. See [Program Properties](#).

Moving the Program to an Output

To move a program to an output:

1. In the Logical Inputs pane, hover over the required program to display the **Menu** drop-down list.
2. From the drop-down list, select **Drop To**.

A menu with the available logical output TSs appears:



3. Select either of the following:

- ❑ **TS > Add to TS.** The program moves to the required output TS.
- ❑ **Programs > Select Programs >** Either create a new output program or select an existing program > Create RSS (Reference program), Add alternative source for Program Redundancy, Add alternative source for Seamless Program Substitution, or Add all PIDs.

Program Properties

To view program properties:

1. In the Logical Inputs pane, select the required program to display the **Menu** drop-down list.
2. From the drop-down list, select **Properties**.

View the following.

Table 3–5: Program Parameters

Parameter	Explanation
Program Number	The program identification number
Program Name	The program name as extracted from the Service Description Table (SDT)
PMT PID	The PID over which the service's PMT (Program Map Table) is transmitted
PCR PID	The PID of the service's PCR (Program Clock Reference)
Bitrate (Mbps)	The program bitrate
Source ID	A PSIP parameter

PID Extraction

To configure PID Extraction:

1. In the Logical Inputs pane, hover over the required PID to display the **Menu** drop-down list.
2. From the drop-down list, select one of the following options:
 - ❑ **Show Path** - View the logical output of the PID.
 - ❑ **Drop to** - Moves to the required program to logical output.
 - ❑ **Properties** - Opens the PID Properties page.

Moving the PID to an Output

To move a PID to an output:

1. In the Logical Inputs pane, hover over the required PID to display the **Menu** drop-down list.

- From the drop-down list, select **Drop To**.
- Select **TS > Add to TS**.

The PID moves to the required output TS.

PID Properties

To view PID Properties:

- In the Logical Inputs pane, select the required PID.
- Click the drop-down list and select **Properties**.

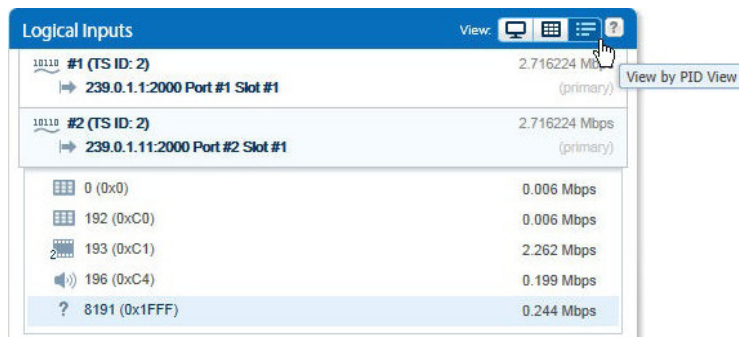
View the following.

Table 3–6: PID Parameters

Parameter	Explanation
PID	Indicates the PID number
ES Type	The type of data carried over a specific elementary stream This parameter does not apply to ghost PIDs or ECMs.
Language	Applies to audio PIDs. Indicates the language.
Scrambled	Indicates whether scrambled
Bitrate	Indicates the bitrate of the PID
CC Errors	Indicates the number of CC errors
CA System ID	Applies to ECMs. Indicates the 16 bit CAS vendor ID.

Working in PID View

You can view the PIDs associated with the TS by shifting to the PID view.



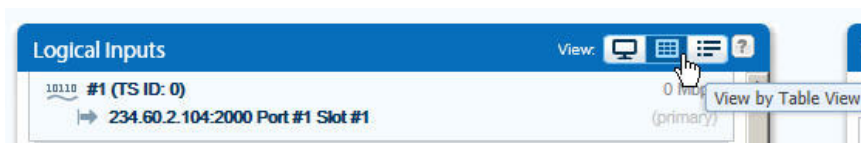
To shift to PID view:

- In the Logical Inputs pane, click the **PID** icon to shift to PID view.
- Select the required TS.

The PIDs associated with the TS appear.

Tables Extraction

Table extraction is available via the Table view.



To view Table extraction:

1. In the Logical Inputs pane, click the **Table** icon to shift to the Table view.
2. Select the required TS.

The tables associated with the TS appear.

3. Click the required table and view the following:

Table 3–7: TS Parameters

Parameter	Explanation
Table Version	Indicates the table version
Number of Section	Indicates the number of section
TS ID	Indicates the TS ID the table is associated with.
Program #, PMT PID #	Indicates the program number and PMT PID the PAT table is associated with

Input TS Protection

ProStream 9100 supports the following input TS protection:

- Enhanced TS protection - This allows any to any source redundancy. For any input, you can configure up to five backup TS or port sources across all input modules. For example, ASI port redundant to IP socket, ASI receiver redundant to IP socket, etc.
- Backup sources are prioritized from 1 - highest - to 5 - lowest. Upon redundancy switch, the device switches to the highest priority source which is in order.
- Input GbE or socket protection. For input TS over a GbE port, socket redundancy is also available. If, TS protection is enabled, only TS protection is available and other internal platform redundancy types are not available.

Configuring TS protection includes the following stages:

- Configuring a primary and a backup source, TS (socket) or port.

For Enhanced protection:

Backup should have the same content as the primary TS.

You can define a backup source on the same port as the primary if over IP, or on a different port and on a different IOM module.

For socket:

You can define a backup source on the same port as the primary if over IP, or on a different port and on a different IOM module.

- Selecting the required redundancy mode.

The following table lists the available modes:

Table 3–8: Input TS Redundancy modes

Parameter	Explanation
Off	No redundancy is required
Manual	The redundancy switch is performed manually
Automatic	The redundancy switch is performed automatically according to the predefined triggers. The device automatically switches between primary and backup according to their activation status and backup priority. Switching from the active one to the none active occurs upon failure of the active one and while the none active is in order. Once primary source is fixed, the device does not revert to the primary as in Automatic Revert. Backup will remain active and it's redundant source will be the primary once it is fixed.
Manual Revert	The redundancy switch is performed automatically according to the predefined triggers. The device automatically switches between primary and backup according to backup activation status and backup priority. However, switching back to the primary, when fixed, is performed manually.
Automatic Revert	The redundancy switch is performed automatically according to the predefined triggers. However, the device automatically switches to the source with the higher priority when the source is stabilized and even though the source with lower priority is still in order. The baseline is that the higher priority and primary are preferred. For each trigger you can define the stabilized time.

- Defining redundancy triggers per TS. When the source flows in over an 8VSBS, the triggers are limited to Source Not Active.
- In case you select **Automatic revert**, configure stabilization time per redundancy trigger.



NOTE: For related alarms, see [Troubleshooting](#).

Configuring Redundancy for Input TS – Manual Mode

To configure redundancy for input transport streams in manual mode:

1. Select the **Logical Input** pane.
2. From the TS **Menu** drop-down list select Source.
3. Focus on **Input Redundancy**.
4. For GbE inputs, do the following, otherwise proceed to Step 6. Open the **Redundancy Type** list and select one of the following:
 - ❑ Enhanced Redundancy
 - ❑ Socket redundancy
5. Open the **Redundancy Scheme** list and select **Manual**.

6. Open the **Number of Backups** list and select the required number of backups. You can select up to five backup sources.
7. The **Active Port** list is currently populated with Primary only. Once you define backup sources, it is populated with these sources as well. Open it and select the required active port. You should use this option once the primary active port has failed.
8. Click **Apply**.

Configuring Redundancy – Automatic Mode

When selecting the Automatic mode, configure the triggers for the redundancy switch.

By default, the alarm *Source Not Active* is always a trigger. You can view the elapsed time between detecting a problem in the input port and raising the *Source Fail* alarm. To configure this threshold, see [Table 3–9](#).

For other triggers, define whether to activate them as triggers for the redundancy switch and the threshold for the redundancy switch.

The Bitrate Underflow and the Scrambled A/V triggers raise an alarm only when they are enabled triggers.

To configure redundancy Automatic mode:

1. Select the **Logical Input** pane.
2. From the **TS Menu** drop-down list, select **Source**.
3. To set redundancy, focus on the **Input Redundancy** section.
4. For GbE inputs, do the following, otherwise, proceed to Step 6.
 - ❑ Open the **Redundancy Type** list and select one of the following:
 - ❑ Enhanced Redundancy
 - ❑ Socket redundancy
5. Open the **Redundancy Scheme** list and select **Automatic**.
6. Open the **Number of Backups** list and select the required number of backups. You can select up to five backup sources. The **Backups** section is updated according to the number of backups.
7. The **Active Port** list is currently populated with Primary only. Once you define backup sources, the list is populated with these sources as well. Open it and select the required active port.
8. **MPEG Sync Loss (Socket Failure)** is selected by default. Click **MPEG Sync Loss (Socket Failure)**. In **Event Duration (sec)**, enter the required threshold time in seconds.
9. For each trigger, enable/disable it and if enabled, set the threshold time in seconds. The following table lists the available triggers and provides important information per trigger:

Table 3–9: TS Protection – Triggers for TS Redundancy

Trigger	Explanation
CC Err	Default threshold is 60 seconds and default number of errors is 4. For example, if during 60 seconds four counter errors occurred, a redundancy switch takes place.
PAT Missing	Default threshold is 2 seconds.
PMT Missing	This trigger requires also PAT missing as a trigger.

Table 3–9: TS Protection – Triggers for TS Redundancy

Trigger	Explanation
PIDs Bitrate Underflow	Default threshold is 5 seconds. If the bitrate is lower than the minimum expected bitrate for five seconds, a redundancy switch takes place.
Scrambled A/V	Based on Scrambling Counter Bits for the routed A/V PIDs only.

Configuring Redundancy – Manual Revert Mode

When selecting the Manual Revert mode, configure the triggers for the redundancy switch.

After a redundancy switch, if you wish to revert to the primary socket, change the mode to Manual and revert.

To configure redundancy manual revert mode:

1. Select the **Logical Input** pane.
2. From the **TS Menu** drop-down list select **Source**.
3. To set redundancy, focus on the **Input Redundancy** section.
4. For GbE inputs, do the following, otherwise proceed to Step 6.
 - ❑ Open the **Redundancy Type** list and select one of the following:
 - ❑ Enhanced Redundancy
 - ❑ Socket redundancy
5. Open the **Redundancy Scheme** list and select **Manual Revert**.
6. Open the **Number of Backups** list and select the required number of backups.
You can select up to five backup sources. **Backups** section is updated according to the number of backups.
7. The **Active Port** list is currently populated with Primary only. Once you define backup sources, it is populated with these sources as well. Open it and select the required active port.
8. **MPEG Sync Loss (Socket Failure)** is selected by default. Click **MPEG Sync Loss (Socket Failure)**. In **Event Duration (sec)**, enter the required threshold time in seconds.
9. For each trigger, enable/disable it.
See [Table 3–9](#). If a trigger is enabled, set the threshold time in seconds.
10. Click **Apply**.
11. Following a redundancy switch, to revert back to primary, or any backup source, open the open the **Redundancy Scheme** list and select **Manual**.
12. Open the **Activate** list and select **Primary**.

Configuring Redundancy – Automatic Revert Mode

Define for each trigger whether to activate it as triggers for the redundancy switch and the threshold for the redundancy switch.

When selecting the Automatic Revert mode, you need also to configure stabilization time. The stabilization time should be bigger than the configured failover time.

To configure redundancy Automatic Revert mode:

1. Open the device browser and login. See [Logging into the Device](#).
2. Select the **Logical Input** pane.
3. From the TS **Menu** drop-down list select Source.
4. To set redundancy, focus on **Input Redundancy** section.
5. For GbE inputs, do the following, otherwise proceed to Step 6.
 - ❑ Open the **Redundancy Type** list and select one of the following:
 - ❑ Enhanced Redundancy
 - ❑ Socket redundancy
6. Open the **Redundancy Scheme** list and select **Automatic Revert**.
7. Open the **Number of Backups** list and select the required number of backups. You can select up to five backup sources. **Backups** section is updated according to the number of backups.
8. The **Active Port** list is currently populated with Primary only. Once you define backup sources, it is populated with these sources as well. Open it and select the required active port.
9. **MPEG Sync Loss (Socket Failure)** is selected by default. Click **MPEG Sync Loss (Socket Failure)**. In **Event Duration (sec)**, and do the following:
 - a. In **Event Duration (sec)**, enter the required threshold time in seconds.
 - b. In **Revert When Error Condition is Off for (sec)**, enter the required time for the error to be Off and to revert to primary.
10. For each trigger, enable/disable it.

See [Table 3–9](#). If a trigger is enabled, set the threshold time in seconds.
11. For each trigger, if enabled, set the required time for the error to be off and to revert to primary (stabilization time) as the following table lists:

Table 3–10: Trigger Parameters

Trigger	Parameter Name	Explanation
CC Err	CC Error Auto Revert	Default stabilization time is 2 seconds and default number of errors is 1. For example, if during 2 seconds 1 counter error did occur, automatic revert takes place.
PAT Missing	PAT/PMT Auto Revert	Default stabilization time is 2 seconds.
PMT Missing	PAT/PMT Auto Revert	
PIDs Bitrate Underflow	Bitrate Auto Revert	Default stabilization time is 2 seconds.

Chapter 4

Output Configuration

Configuring Output Ports and Provisioning the ProStream

The procedure of configuring the output ports and of provisioning the ProStream includes several stages. The order in which you perform these stages varies according to the output port. However, the essential stage is provisioning the device.

Defining Broadcasting Networks

To organize the broadcasting devices, define the networks and later on associate TSs to the networks required. A network can include the following types of TS:

Local TS - TS is transmitted by the device you are currently configuring

External TS - TS is transmitted by another device, yet it belongs to one of the networks of your device. If a NIT table is generated for the network, the NIT also points to the external TSs.

To define networks:

1. Open the web client of the device.
2. Select the **Configuration** page.
3. Focus on the **Logical Outputs** pane.
4. Click the drop-down list in the title bar of the **Logical Outputs** pane and select **Network View**.

The **Logical Outputs** pane has been updated to show all existing networks.

5. To add a network, select **Network (#)** and from the drop-down menu, select **Add New**.
6. Select the required network from the drop-down menu.
7. Select one of the following:
 - ☐ Properties - To configure the network properties
 - ☐ Delete - To remove networks

Configuring Network Properties

To configure network properties:

1. Once you have selected **Properties**, the **Network# Properties** dialog appears.
2. In **Network ID**, enter the required Network ID.

You can enter any available network ID as long as this value is not the same as another network ID.

3. In **Network Name**, enter the required name.
4. To overwrite the NIT version, select **Overwrite NIT version**.

The **NIT Version** box is enabled.

5. In **Override**, enter the required NIT version.

For NIT descriptors, see [Provisioning the Output TS](#).



TIP: Local TSs are associated with the network when configuring the TSs.

6. To add external TSs, click **Add**.



NOTE: The local TSs are added while configuring the TS. See [Provisioning the Output TS](#).

7. Enter the following information:
- ❑ **TS ID** - Enter the required TS ID
 - ❑ **Original Network ID** - Enter the network ID of the originating delivery system.
 - ❑ **Location** - View either of the following:
 - ❑ **Local** - The TS is transmitted by the device
 - ❑ **External** - The TS is transmitted by another device
8. To add a network descriptor, click **Add** in the **Descriptor** section.
9. In the **Edit Descriptor** dialog, enter the following information:
- ❑ **Descriptor** - enter the descriptor type as defined by the DVB standard.
 - ❑ **Value in Hex** - enter the value according to the SDV standard.



TIP: If the TS is transmitted with a NIT, the NIT points to both local and external TSs and the table includes all configured descriptors.

Configuring the Output Socket – GbE Output Port Only

To output streams via a GbE output port, configure the sockets first. A socket is a terminal for a TS. Each socket is defined by a unique combination of an IP address and UDP port.

You can add up to 128 sockets and add multiple sockets in one step. In addition, you can delete sockets at any time.



NOTE: A socket must be unique in terms of IP Address, port number, SSM, and VLAN tagging.

To add a socket:

1. In the **Physical Output** section, select a GbE port.
2. In the drop-down menu, select **Add New**.

To configure a socket:

1. In the **Physical Output** section, select the required socket.
2. Select either of the following:
 - ❑ **New socket** - Click the new socket to open the **Socket Properties** dialog box.

- Existing socket - In the drop-down menu, select **Properties**.

Output Socket S1:P2, [ff08::1] : 2000 : General Properties

General | Advanced

Enable: ☒

Socket Description :

Source TS: TS #1 (TS ID: 2) - Transport

IP Type: Multicast

IP Version: IPv6

IP Address: ff08::1

UDP Port: 2000

Encapsulation Mode: RTP

SSRC ID: 450001

Disable Scrambling: ☐

Bitrate

Bitrate: CBR

Bitrate(Mbps): 4

OK Cancel Save

3. Configure the socket as follows:

- Enable** - Select to enable the socket.
- Socket Description** - Enter a short description that identifies the socket.
- Source TS** - The list is populated with the incoming TSs. Select the required incoming TS.
- IP Type** - Open the list and select Unicast or Multicast.
- IP Version** - Select IPv4 or IPv6.
- IP Address** - Type in the destination IP address as follows:
 - Unicast, class A: 1.0.0.0 - 126.255.255.255
 - Unicast, class B: 128.0.0.0 - 191.255.255.255
 - Unicast, class C: 192.0.0.0 - 223.255.255.255
 - Unicast, class D: 224.0.0.0 - 239.255.255.255



NOTE: The following reserved ranges should not be used:

Reserved - 224.0.0.0 to 224.0.0.255

Reserved for administration - 239.0.0.0 to 239.255.255.255

- UDP Port** - The UDP port to listen on. The available range is 1- 65535.



TIP: You can sort IP/UDP columns by double clicking the columns headings.

- Encapsulation Mode** - Select either of the following:

- ❑ UDP - According to the transmitter/receiver
- ❑ RTP - According to the transmitter/receiver. If FEC is used, select RTP. The FEC section appears:



NOTE: The FEC section does not appear when you use a Quad GbE card.

4. Focus on the FEC section.

FEC (Forward Error Correction) requires extra data for detecting and correcting the errors. The extra data is sent on a separate socket(s) and includes the number of rows and columns to be calculated. A higher number of rows and columns yields a higher overhead and a better error correction ability. Define the FEC parameters as follows:

- ❑ Enable - Select to apply FEC.
 - ❑ Num of Col - Enter the number of columns to be calculated.
 - ❑ Num of Row - Enter the number of rows to be calculated.
 - ❑ 2D Only - Select to enable 2 Dimensional FEC, in which only columns are calculated.
5. If RTP is used for the encapsulation mode, an **SSRC ID** between 0 and 4294967295 can be entered.
 6. **Disable Scrambling** - Generates a clear TS at the output.
 7. Focus on the **Bitrate** section and configure the following:
 - ❑ Bitrate Mode - Bitrate mode of the output TS. Options are:
 - ❑ CBR (Null Padding)
 - ❑ VBR (Accurate PCR) (Only available when using a Quad GbE card)
 - ❑ VBR with no PCR correction - VBR without bitrate generation and without added null PIDs to maintain the bitrate
 - ❑ Bitrate (Mbps) - The required bitrate in Mbps of the output TS.

8. To configure advanced parameters, select the **Advanced** tab.

9. **IP Packet Size (Bytes)** - Open the IP Packet Size and select the IP packet size ranging from 188 - 1316 bytes.

The packet size is derived from the number of MPEG packets that are packed in a single IP packet, as indicated in the following table:

IP Packet Size	MPEG Packet
1316	7
1128	6
940	5
752	4
564	3
376	2
188	1



NOTE: The larger the IP packet size is, the more MPEG packets it carries and the overhead is smaller.

10. **Time to Live** - For IPv4 sockets, select the TLL for this IP datagram.

11. **Hop Limit** - For IPv6 sockets, select an integer in the range of 0 - 255.

Configuring Source IP Address

The configuration of the Source IP Address section differs slightly between IPv4 and IPv6 sockets.

To configure Source IP Addresses for IPv6 sockets:

1. **Source IP Address** - Enter the address.
2. **Source UDP Port** - Select the packet source (sender) UDP port.

This is an integer in the range of 0 - 65535.

To configure Source IP Addresses for IPv4 sockets:

1. **Port's Own IP** - Select to set the packet source (sender) IP address as the IP address of the port.
2. **Override** - Select to set the packet source (sender) IP address to a different IP address. Once selected, enter the required IP address.
3. **Source UDP Port** - Select the packet source (sender) UDP port.

Configuring QoS

The configuration of the Source IP Address section differs between IPv4 and IPv6 sockets.

To configure QoS for IPv6 sockets:

1. **Flow Label** - Select the flow label identifier.
This is an integer in the range of 0 - 1048575.
2. **Traffic Class** - Select the traffic class.
This is an integer in the range of 0 - 255.

To configure QoS for IPv4 sockets:

1. To define the method to mark and classify packets, open the **QoS Type** list and select one of the following:
 - ☐ **IP Precedence** - The original standard used to classify and prioritize types of traffic. Select the values to make up the TOS with IP Precedence octet as follows:

	Precedence	TOS	Not Used
Bits	3	4	1
Default Value	Normal Service (0x0)	Routine (0x0)	



NOTE: The implementation used by Harmonic is described in RFC 1349.

- ☐ **DiffServ** - TOS with (DSCP) Differentiated Services Code Point is a 6-bit field allowing more combinations and more behavior possibilities, such as PHB (per-hop forwarding behavior). For Class/Drop Probability, the first 3 bits are the class selector and the next 3 bits are drop probability. For Assured Forwarding, select AF11 to AF43. For Expedited Forwarding, select EF. The structure is shown here:

	DiffServ Point	Not Used
Bits	6	2
Default Value	000000	00

NOTE: For definitions of these behavior settings, see RFC 2474, RFC 2597, RFC 2598.

- ❑ Free Entry - Allows entry of any binary value into the TOS field octet. This is included to provide complete flexibility for TOS field definition, as needed. For example, it can be used for proprietary TOS definitions, or in case another TOS paradigm is introduced.
- 2. To define the precedence option, open the **Precedence** list and select one of the following:
 - ❑ Routine (0x0)
 - ❑ Priority (0x1)
 - ❑ Immediate (0x2)
 - ❑ Flash (0x3)
 - ❑ Flash Override (0x4)
 - ❑ Critical (0x5)
 - ❑ Internetwork Control (0x6)
 - ❑ Network Control (0x7)
- 3. To define the type of service option, open the **Type of Service** list and select one of the following:
 - ❑ Normal Service (0x0)
 - ❑ Minimize Monetary Cost (0x1)
 - ❑ Maximize Reliability (0x2)
 - ❑ Maximize Throughput (0x4)
 - ❑ Minimize Delay (0x8)
- 4. To enable **VLAN Tagging**, do the following:
 - a. Set VLAN Tagging Mode to 802.1Q
 - b. Enter **VLAN** Identifier
 - c. Check **Drop Eligible Indicator** if required
 - d. Select the **Priority Code Point** from the drop-down list

Integer	Key
0	Best Effort (Default)
1	Background
2	Excellent Effort
3	Critical Applications
4	Video, <100 ms latency and jitter
5	Voice, <10 ms latency and jitter
6	Internetwork Control
7	Network Control

Provisioning the Output TS

Provisioning the Output TS comprises the following procedures:

- Configure TS Properties
 - ❑ Associate the TS with a network ID

- ❑ Define whether to scramble with a fixed key
- Determine which tables to create in the TS level. Available tables vary according to the port type that outputs the TS. See [Adding Tables to TS](#).
- Set time zones, if broadcasting time offset information (TOT) is important. See [Configuring TOT](#)
- Decide whether to mirror the TS. See [TS Mirroring](#).



NOTE: The following instructions refer to TSs to be output over a GbE port or ASI port, unless indicated elsewhere.

- Add content to the TS. See [Adding Components to the TS](#).

Configuring Output TS Properties

To configure output TS properties:

1. Select the required TS and from the drop-down menu select **Properties**.
2. In **TS ID**, enter the required ID number.
3. In **TS Description**, enter a short description of the TS.
4. To associate the TS with a network, open the **Network ID** list and select the network ID.

The list is populated with the networks IDs defined during Network configuration. See [Defining Broadcasting Networks](#).

5. To enter a scrambling Key focus on **Scrambling Key**.

The **Scrambling Key** section allows you to define whether you want to scramble the TS with a fixed key or not. You can select either of the following:

- ❑ None - No scrambling is required and the TS is output as a clear transport. In Fixed Key application, select this option on the Descrambler.
- ❑ Fixed Key - Select to allow scrambling each socket with a different key. It prevents mass de-scrambling by unauthorized viewers in the very rare cases that the keys are unveiled. In Fixed Key application, select this option on the Scrambler.

Adding Components to the TS

Prior to provisioning the TS, you can add the following:

- Program
- PID
- Injected EMM
- Injected ECM
- Passed EMM

You can also manage the table added to the TS. See [Adding Tables to TS](#).

To add a component to the TS:

1. Select the required TS and from the drop-down menu, select **Add New**.
2. Select one of the following:
 - ❑ Program - Added under Program
 - ❑ PID - Added under Unreferenced PIDs
 - ❑ Injected EMM - Added under CA PIDs
 - ❑ Injected ECM - Added under CA PIDs

- ❑ Passed EMM - Added under CA PIDs

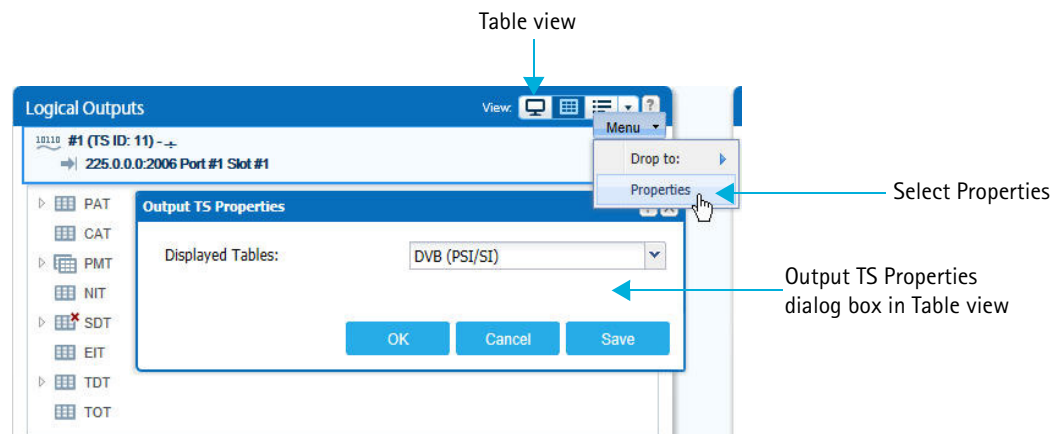
See also [Adding Content to TS](#).

Adding Tables to TS

To select the tables to configure for this transport:

1. In **Logical Outputs** pane, switch to Tables view.
2. Select the required TS and from the drop-down menu select **Properties**.

The **Output TS Properties** dialog appears:



3. Open the **Displayed Tables** list and select one of the following:
 - ❑ None - The device does not generate tables for this transport.
 - ❑ MPEG (PSI) - PAT, CAT, and PMT tables.
 - ❑ ATSC (PSIP) - Enables configuration of external PSIP table generation for this TS. (PAT, PMT, CAT, MGT, VCT, EIT and ETT).
 - ❑ DVB (PSI/SI) - PAT, CAT, PMT, NIT, SDT, EIT, TDT and TOT.

The following table shows the tables, the tables available and references to step-by-step instructions:

Table 4–1: Table Reference Table

Table	Displayed Tables	Reference to Table Info
PAT	<ul style="list-style-type: none"> ■ MPEG (PSI) ■ ATSC (PSIP) ■ DVB (PSI/SI) 	Configuring PAT
PMT	<ul style="list-style-type: none"> ■ MPEG (PSI) ■ ATSC (PSIP) ■ DVB (PSI/SI) 	Configuring PMT
CAT	<ul style="list-style-type: none"> ■ MPEG (PSI) ■ ATSC (PSIP) ■ DVB (PSI/SI) 	Configuring CAT
NIT	<ul style="list-style-type: none"> ■ DVB (PSI/SI) 	Configuring NIT

Table 4–1: Table Reference Table

Table	Displayed Tables	Reference to Table Info
SDT	■ DVB (PSI/SI)	Configuring SDT
EIT	■ ATSC (PSIP) ■ DVB (PSI/SI)	Configuring EIT
TDT	■ DVB (PSI/SI)	Configuring TDT
TOT	■ DVB (PSI/SI)	Configuring TOT
MGT	■ ATSC (PSIP)	Configuring MGT
VCT	■ ATSC (PSIP)	Configuring VCT
EIT	■ ATSC (PSIP)	Configuring EIT in ASCT (PSIP) Mode
ETT	■ ATSC (PSIP)	Configuring ETT

Configuring PAT

You can create a Program Associated Table that contains the PMT PIDs of all services included in the TS. The version control of the PAT is per TS.

To configure a PAT:

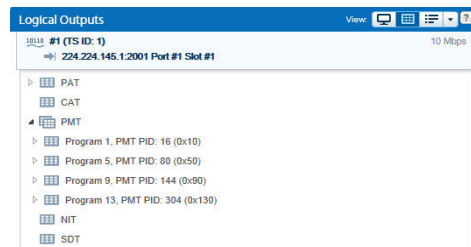
- In **Output TS Properties** select one of the following:
 - ☐ MPEG (PSI)
 - ☐ ATSC (PSIP)
 - ☐ DVB (PSI/SI)
- To view PAT information, click the arrow-head next to the PAT and view the displayed information:
- To configure the PAT, from the drop-down menu, select **Properties**.
- Open the **PAT Mode** list and select one of the following options:
 - ☐ None - Device does not generate PAT.
 - ☐ Generate - Device generates PAT.
 - ☐ Pass - Device passes the PAT without any changes.
- Once you have selected **Generate**, configure the following:
 - Repetition Rate (ms) - Enter the required spooling rate.
 - TS ID - Select the TS ID.
 - Table Version - by default version control is automatically incremented upon changes to the table. However, once you select **Override**, the table version is changed manually only and you should select the required table version, from 0 to 31. Version control is configured per TS.
 - Reference NIT - select to add to the PAT a pointer that the TS carries a NIT.
- Once you have selected **Pass**, configure the following:
 - Input TS - Select the required input TS.
 - Input PID - Select the required input PID.

Configuring PMT

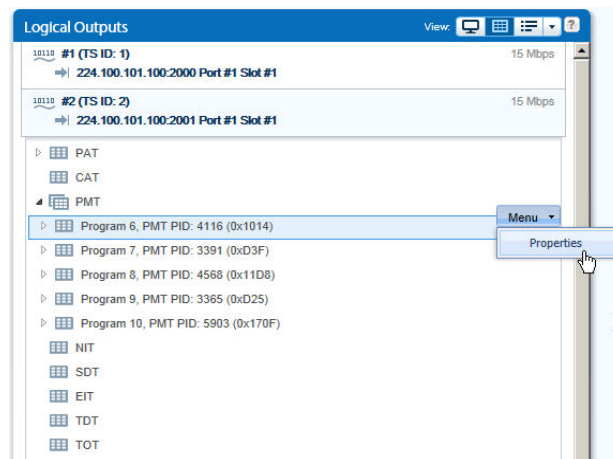
To configure PMT:

1. In **Output TS Properties** select one of the following:
 - ☐ MPEG (PSI)
 - ☐ ATSC (PSIP)
 - ☐ DVB (PSI/SI)
2. To view PMT information, click the arrowhead next to the PMT.

A list of all the TS programs with their PMT PID appears.



3. To configure the PMT, select the required PMT PID and from the drop-down menu, select **Properties**.



4. Mode - Open the **Mode** list and select one of the following:
 - ☐ None - The components of the service are streamed without any PMT.
 - ☐ Generate - The default option. ProStream creates a new PMT for the service. See Step 5.
 - ☐ Pass - The ProStream transfers the Input PMT to an output stream without changing or manipulating it. The PAT includes a reference to this PMT. See Step 6.
 - ☐ Regenerate - The device creates a PMT according to the program configuration and input descriptors. See Step 7.
 - ☐ Conditional PMT - The output program is configured as a dynamic program and you can select the input program ID for the reference PMT. When selected, PMT is generated at the output as long as the program flows into the device.
If the input program disappears from the input PAT, the output PSI are updated according to the changes in corresponding input service:
 - ☐ The service is removed from the output PAT.
 - ☐ The device does not stream out the PMT.

- ❑ The device does not raise any alarm regarding this service. See Step 7.
5. After selecting **Generate**, configure the following

Output PMT of Program 6 (Srv_6) of TS #2 Properties

Mode: Generate

Repetition Rate: 330

Table Version

☒ Automatic:

☐ Override:

Descriptors

Descriptor	Tag	Value in...	Value in...
<input checked="" type="checkbox"/>			

Add Remove

OK Cancel Save

- ❑ Repetition Rate (ms) - Enter the required spooling rate.
 - ❑ Table Version - By default, version control is automatically incremented upon changes to the table. However, if you select **Override**, the table version is changed manually only and you should select the required table version, from 0 to 31. Version control is configured per TS.
6. If you selected **Pass**, configure the following:

Output PMT of Program 6 (Srv_6) of TS #2 Properties

Mode: Pass

Source

Input TS: None

Input PID: 32 (0x20)

OK Cancel Save

- ❑ Input TS - Select the required input TS
- ❑ Input PID - Select the required input PID

7. If you have selected **Regenerate** or **Conditional Generate**, configure the following:

- ❑ Repetition Rate (ms) - Enter the required spooling rate.
 - ❑ Table Version - By default version control is automatically incremented upon changes to the table. However, if you select **Override**, the table version is changed manually only and you should select the required table version, from 0 to 31. Version control is configured per TS.
 - ❑ Input TS - Select the required input TS.
 - ❑ Input PID - Select the required input PID
8. To add a descriptor to the PMT, in the **Descriptor** section, click **Add**.
Applies to **Generate**, **Regenerate** and **Conditional Generate** modes.
9. Open the **Descriptor** list and select the required descriptor.

The list of descriptors includes the following:

Listed Descriptors	Explanation
Pre-defined descriptors	<ul style="list-style-type: none"> ■ Registration descriptor ■ Language descriptor ■ Platform descriptor ■ Integrated signaling descriptor
User Defined Descriptors	<p>This section includes descriptors that you need to define by entering the descriptor details in hexadecimal. See Standard ES Types and Descriptors.</p>

10. Configure the descriptor as required. Typically, enter in **Value in Hex**, the required value.

If you are using a CA descriptor, configure the following:

- ❑ In **CAS ID (4 Digits)**, enter the required ID.
- ❑ In **CAS PID**, select the required CAS PID.
- ❑ In **Private Data**, enter a string of up to 100 bytes that is added to the CA descriptor. You can enter it either in ASCII or in Hex by selecting either **ASCII** or **HEX**.

If you select a Registration descriptor, configure the following:

- ❑ In **Format Identifier**, enter the required format identifier.
- ❑ In **Additional Identification Info**:, enter the additional information.

11. Click **OK**.

The descriptor is added to the list of descriptors. You can edit them by clicking **Edit**.

Filtering a Descriptor at a TS Level

You can remove input descriptors in TS level, resulting in removing the indicated input descriptors from all services of the output TS. To filter the input descriptors, enter in the **Stream Descriptors TAG Filters** box the descriptor TAGs you wish to remove from the output TS.

To filter a descriptor:

1. In Table view, in **Output TS Properties** select one of the following:
 - ❑ MPEG (PSI)
 - ❑ ATSC (PSIP)
 - ❑ DVB (PSI/SI)
2. Select the PMT container and from the drop-down menu select **Properties**.
By default, **Descriptors** is selected.
3. Click **Add**.
4. Open the list of descriptors and select the required one.
5. Click **OK**.

Configuring CAT

ProStream creates a Conditional Access Table. This table contains information that is used by an access device (such as a set top box with a smart card) to decode programs that are part of a Conditional Access System. See also [Allocating EMM PIDs](#).

Version control is configured per TS.

To configure CAT:

1. In **Output TS Properties** select one of the following:
 - ❑ MPEG (PSI)
 - ❑ ATSC (PSIP)
 - ❑ DVB (PSI/SI)
2. From the drop-down menu, select **Properties**.
3. Open the **CAT Mode** list and select one of the following options:
 - ❑ None - Device does not generate CAT.
 - ❑ Generate - Device generates CAT.
 - ❑ Pass - Device passes the CAT without any changes.
4. If you select **Generate**, configure the following:
 - ❑ **Repetition Rate (ms)** - Enter the required spooling rate.
 - ❑ **Table Version** - By default, version control is automatically incremented following changes to the table. However, if you select **Override**, the table version is changed manually only and you should select the required table version, from 0 to 31. Version control is configured per TS.

5. If you select **Pass**, configure the following:
 - ❑ **Input TS** - Select the required input TS.
 - ❑ **Input PID** - Select the required input PID

Configuring NIT

ProStream creates a (Network Information Table). Version control is per network.

To configure NIT:

1. In **Output TS Properties**, select DVB (PSI/SI).
2. To configure the NIT, from the drop-down menu, select **Properties**.
3. Open the **NIT Mode** list and select one of the following options:
 - ❑ **None** - Device does not generate NIT.
 - ❑ **Generate** - Device generates NIT.
 - ❑ **Pass** - Device passes the NIT without any changes.
4. **Reference NIT in PAT** - Select to add to the PAT a pointer that the TS carries a NIT.
5. Depending on the NIT Mode selected, configure the following:

For **Generate**:

- ❑ **Repetition Rate (ms)** - Enter the required spooling rate.
- ❑ **Generate NIT Other** - Select to generate NIT tables to TSs with network IDs that are different than the selected TS. Namely, it allows to generate a NIT for other networks in addition to the actual network.
- ❑ **Descriptors** - Add or remove user defined NIT descriptors using the Add and Remove buttons. See [NIT Descriptors](#).
- ❑ To add a descriptor click **Add**.
- ❑ To edit a descriptor, click **Edit**.
- ❑ In **Descriptor**, select the required user-defined descriptor.
- ❑ In **Value in HEX**, enter the required value.

For **Pass**:

- ❑ **Input TS** - Select the TS over which the NIT table streams into the device.
- ❑ **Input PID** - Select the PID over which the NIT table streams into the device.

NIT Descriptors

The NIT descriptors include the following:

Sections of List	Explanation
Pre-defined descriptors	<ul style="list-style-type: none"> ■ 0x43 Satellite delivery info ■ 0x44 Cable delivery info ■ 0x5a Terrestrial delivery info ■ 0x33 Logical channel number
Descriptors	Descriptors that you define by entering the descriptor details in hexadecimal.

Configuring SDT

ProStream creates a Service Description Table (SDT). This table contains data describing the services, for example, the names of services, the service provider, etc. SDT relates to all services of the TS. You can also select **Generate SDT Other**. SDT other relates to all services of TSs that belong to the same network, that is that have the same network ID.

- SDT - Version control is configured per TS
- SDT other - Version control depends on SDT actual

To configure SDT:

1. In **Output TS Properties**, select DVB (PSI/SI).
2. To configure the SDT, from the drop-down menu, select **Properties**.

The **Output SDT of TS# Properties** appears.

3. Open the **SDT Mode** list and select one of the following options:
 - ☐ **None** - Device does not generate NIT.
 - ☐ **Generate** - Device generates NIT.
 - ☐ **Pass** - Device passes the NIT without any changes.
4. Depending on the SDT Mode selected, configure the following:

For **Generate**:

- ☐ **Original Network ID** - Select the ID of the originating delivery system.
- ☐ **Repetition Rate (ms)** - Enter the required spooling rate.
- ☐ **Table Version** - By default, version control is automatically incremented following changes to the table. However, if you select **Override**, the table version is changed manually only and you should select the required table version, from 0 to 31. Version control is configured per TS.
- ☐ **Generate SDT Other** - When selected, generates SDT also to all services of the TSs that have the same network ID.

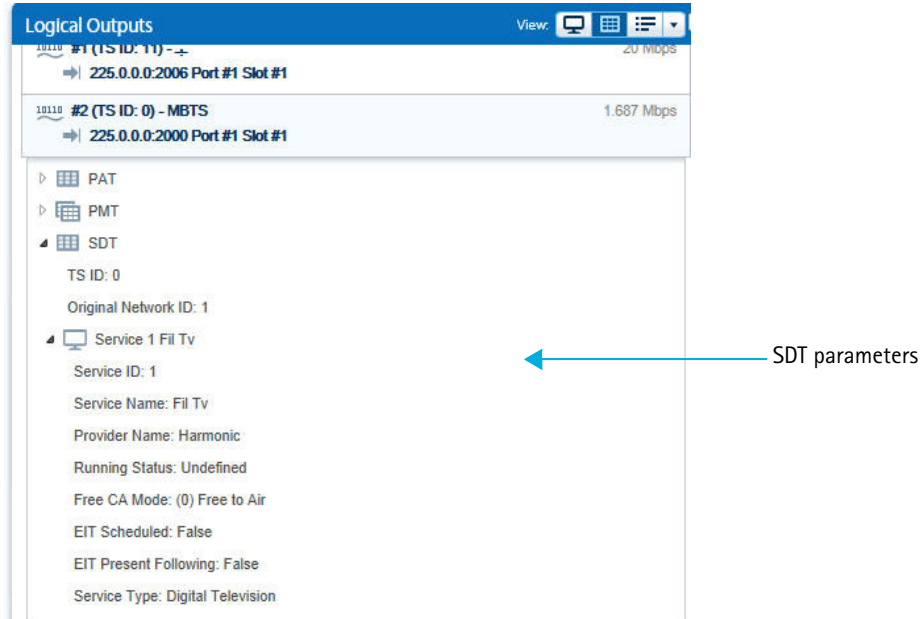
For **Pass**:

- ☐ **Input TS** - Select the TS over which the SDT table streams into the device.
- ☐ **Input PID** - Select the PID over which the SDT table streams into the device.

Viewing SDT Parameters

To view SDT parameters:

1. In **Table** view, click the arrowhead next to the SDT table:



2. View the following:

Parameter	Explanation
TS ID	The TS that to its programs the SDT table related to.
Original Network ID	The input network ID
Service ID	The ID of the program
Service Name	The name of the program
Provider Name	The name of the service provider as defined by the DVB standard.
Running Status	Running Status - indicates the status of the service: <ul style="list-style-type: none"> ■ Undefined ■ Not running ■ Starts in a few seconds ■ Pausing ■ Running
Free CA Mode	Indicates that at least one component of the service is scrambled.
EIT Scheduled	Indicates that EIT schedule information for the service is present in the current TS
EIT Present Following	Indicates that EIT schedule information/following for the service is present in the current TS.

Parameter	Explanation
Service Type	Indicates the type of the service as defined in the DVB standard. It allows the service provider to describe the nature of the service, such as, broadcast television, on-demand television, broadcast radio, data broadcast etc'.

Configuring EIT

You can regenerate the Event Information Table (EIT) at the output. To regenerate, ProStream 9100 parses the EIT at the input and draws the relevant events according to the services included in the output TS.

Specification	Explanation
EIT PID	0x12
Table ID	0x4E - for current/next events 0x50 - 0x5F - for scheduled events
Parsing	Up to 500 services Average of 165 events per service
Output	Up to 128 services
ProStream	ProStream 4.10 and up

To configure EIT:

- In **Output TS Properties** select one of the following:
 - ☐ DVB (PSI/SI)
 - ☐ ATSC (PSIP) - See [Configuring EIT in ASCT \(PSIP\) Mode](#).
- To view EIT parameters, click the arrowhead next to EIT. View the EIT PIDs of the TS;



- To configure the EIT, from the drop-down menu, select **Properties**.
- Open the **EIT Mode** list and select one of the following options:
 - ☐ None - Device does not generate EIT.
 - ☐ Re-Generate - Device re-generates EIT.
 - ☐ Pass - Device passes the EIT without any changes.
- If you select **Pass**, configure the following:
 - ☐ **Input TS** - Select the TS over which the SDT table streams into the device.

- ❑ **Input PID** - Select the PID over which the SDT table streams into the device.

Configuring TDT

ProStream creates a Time Date Table.

To configure a TDT:

1. In **Output TS Properties** select the following: DVB (PSI/SI)
2. To configure the TDT, from the drop-down menu, select **Properties**.
The **Output TDT of TS# Properties** appears.
3. Open the **TDT Mode** list and select one of the following options:
 - ❑ **None** - Device does not generate TDT.
 - ❑ **Generate** - Device generates TDT.
 - ❑ **Pass** - Device passes the TDT without any changes.
4. If you selected **Pass**, configure:
 - a. **Input TS** - Select the TS over which the TDT table streams into the device.
 - b. **Input PID** - Select the PID over which the TDT table streams into the device.
 - c. **Report if PID Missing**:
 - ❑ If no report should be issued, select **None**
 - ❑ If a report should be issued, Select **Threshold (sec)**: and choose the time between 5 and 300 seconds for the delay before the report is issued.

Configuring TOT

ProStream creates a Time Offset Table.

To configure a TOT:

1. Click the **Create TOT** link to configure the TOT time zones.
2. In **Output TS Properties** select the following: DVB (PSI/SI).
3. To configure the TOT, from the drop-down menu, select **Properties**.
4. Open the **TOT Mode** list and select one of the following options:
 - ❑ **None** - Device does not generate TOT.
 - ❑ **Generate** - Device generates TOT.
 - ❑ **Pass** - Device passes the TOT without any changes.
5. Depending on the TOT Mode you have selected, configure the following:
For **Generate**:
 - ❑ **Country Code** - Open the list and select the required country code.
 - ❑ **Country Region ID** - Select the region ID.
 - ❑ **Local Time Offset** - Select the local time offset according to GMT.
 - ❑ **Date to Change** - Select the Day Light Saving date.
 - ❑ **Time to Change** - Type in Time to Change the required time according to the required format: hh:mm:ss PM/AM.
 - ❑ **Next Time Offset** - Select the local time according to GMT in which Day Light Saving is expected to change.

For **Pass**:

- ❑ Input TS - Select the TS over which the TOT table streams into the device.
- ❑ Input PID - Select the PID over which the TOT table streams into the device
- ❑ Report if PID Missing:
 - ❑ If no report should be issued, select **None**
 - ❑ If a report should be issued, Select **Threshold** (sec): and choose the time between 5 and 300 seconds for the delay before the report is issued.

PSIP Tables

The Program and System Information Protocol (PSIP) standard, is an extension of the MPEG2 encoding standards. PSIP is a collection of tables designed to operate within every transport stream for terrestrial broadcast of digital television. The purpose of PSIP is to describe information at system and event levels for all services carried in a particular TS. Additionally, information for analog channels as well as digital channels from other TSs may be incorporated.

PSIP includes the following tables:

- STT (System Time Table) - Provides time reference
- MGT (Master Guide Table) - Lists the PIDs of each of the tables
- VCT - Lists all virtual channels included in the TS. VCT refers to either of the following:
 - ❑ TVCT (Terrestrial Virtual Channel Table)
 - ❑ CVCT (Cable Virtual Channel Table)
- EIT (Event Information Table) - Provides information about events planned on the virtual channels
- ETT (Extended Text Table) Optional - Detailed information about the planned events

Configuring MGT

ProStream creates an MGT, PSIP Master Guide Table. This table lists the PIDs of each of the PSIP tables.

To configure MGT:

- In **Output TS Properties** select **ATSC (PSIP)**.

Configuring VCT

ProStream creates a VCT table. It lists all virtual channels included in the TS. VCT refers to either of the following:

- TVCT (Terrestrial Virtual Channel Table)
- CVCT (Cable Virtual Channel Table)

To configure a VCT:

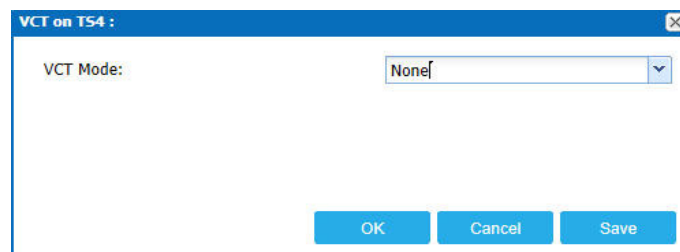
1. In Logical Outputs, click **Table View**.
2. Right-click the TS and click **Properties**.
3. Select **ATSC (PSIP)** from the drop-down menu.

4. To view the VCT parameters, click the arrowhead next to the VCT table and view the TS it is associated with:

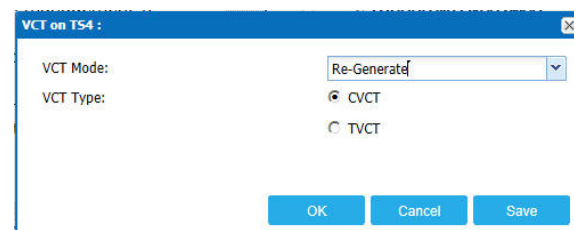


- ☐ TS ID - View the TS ID that carries the VCT
 - ☐ Channel - Click the channel to view its components.
 - ☐ Major Channel Number - View the number of the major channel.
 - ☐ Minor Channel Number - View the number of the minor channel.
5. To configure the channel if the broadcast provider has changed the channel number, do the following:
 - ☐ From the drop-down menu, select **Properties**.
 - ☐ Service Name Override - Select to override the service name.
 - ☐ Enable override - Select to edit channel parameters.
 - ☐ Major Channel Number - Enter the required channel number.
 - ☐ Minor Channel Number - Enter the required channel number.
 6. To configure the VCT, from the drop-down menu, select **Properties**.

The **Output VCT of TS# Properties** appears.



7. Open the **VCT Mode** list and select one of the following options:
 - ☐ None - Device does not generate VCT.
 - ☐ Re-generate - Device generates VCT.
8. If you selected **Re-Generate**, select one of the following VCT types:



- ☐ CVCT
- ☐ TVCT

Configuring EIT in ASCT (PSIP) Mode

For a short overview, see [Configuring EIT](#).

To configure EIT in this mode:

1. In **Output TS Properties** select the following: ATSC (PSIP).
2. To configure the EIT, from the drop-down menu, select **Properties**.
3. Open the **EIT Mode** list and select one of the following options:
 - ☐ None - Device does not generate EIT.
 - ☐ Re-Generate - Device re-generates EIT.
4. In **EIT PID**, select the EIT PID.
5. To view EIT PIDs, click the arrow-head next to EIT.



Configuring ETT

To configure ETT:

1. In **Output TS Properties** select the following: ASCT (PSIP).
2. To view the ETT parameters, click the arrow-head next to ETT:



3. To configure the ETT, from the drop-down menu, select **Properties**.
4. ETT PID - select the required PID to outstream the ETT table.

Provisioning the TS

Once you have finished configuring the TS you can provision it.

To provision the TS:

1. Send the configuration to the device by clicking **Apply**.

2. Select the required TS and from the drop-down menu, select **Drop To**.

TS Mirroring

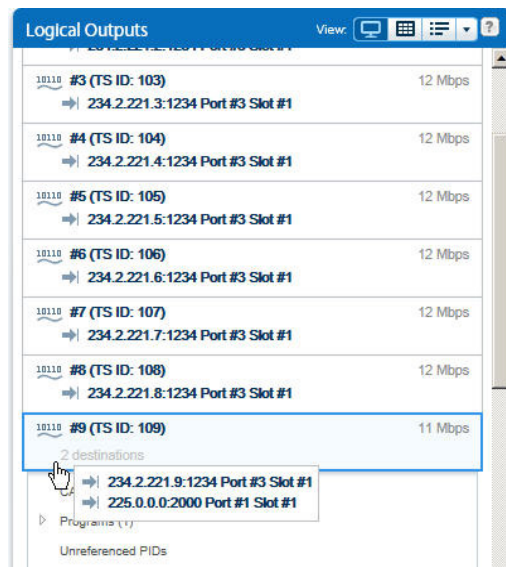
This feature enables you to duplicate an output TS for monitoring purposes. The device duplicates and outputs a TS from any interface (IP, ASI) to any other TS over any interface. This feature supports all the functionality of the mirrored TS such as rate shaping, scrambling, RSS, tables generation, common PCR, PID range or DTolP. You can configure the mirrored TS to be always clear.

NOTE: If you want to create a mirror of the TS on the ASI port in the Physical Outputs, make sure to first remove its related ASI in the Logical Outputs, otherwise you get an error message that the port is already in use.



To enable mirroring:

1. Verify that the mirroring TS is clear of any configuration and provisioning.
2. In **Logical Output**, select the required TS.
3. Drag the TS and drop it to the required output in **Physical Output** pane.
4. View the destinations of the TS in the **Logical Output** pane.



5. Click **Apply**.

Adding Content to TS

You can add the following to a TS:

- Program - Add a program and configure it as explained in [Configuring Program Properties](#).
- PID - A PID is added to the TS as an unreferenced PID. See [Adding Ghost PIDs to the TS](#).
- Injected EMM - An EMM is added to the CA PID container. See [Adding and Configuring EMM PIDs to the TS](#)
- Injected ECM - An ECM is added to the CA PID container. [Adding and Configuring ECM PIDs to the TS](#).
- Passed EMM - The passed EMM is added to the CA PID container. See [Adding and Configuring EMM PIDs to the TS](#).

Provisioning/Multiplexing Stream Content

When provisioning/multiplexing, you route a specific input (service/PID) to a specific output (service/PID). You can use the Logical Inputs pane (when you read input information from the input ports) and move programs or PIDs from Inputs to the Logical Outputs pane and then provision them. On the other hand, you can use the Add New options to add new programs or/ and PIDs and provision them. To provision a Reference Service, see [Reference Service \(RSS\)](#).

You can add a program to a TS or to another program.

An input service is provisioned to an output transport stream only. An input PID is provisioned to an output service or transferred as an independent PID (ghost PID).

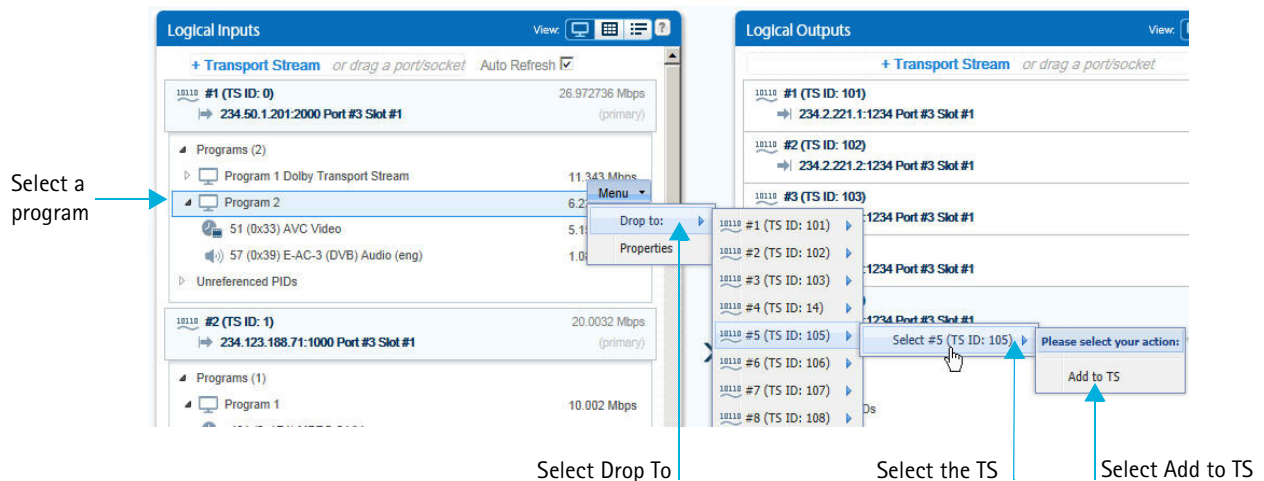
Provisioning/Multiplexing a Program

When provisioning a service, you can change its service ID, name, PMT PID and PCR PID. In addition, you can add to a service a Reference Service. See [Reference Service \(RSS\)](#).

Moving a program From Input to an Output TS

To move a program to an Output TS:

1. In the **Logical Inputs** section, select a program.
2. In the drop-down list, select **Drop To**.
A list of all the available output TSs appears.
3. Select the required TS > **Add to TS**.

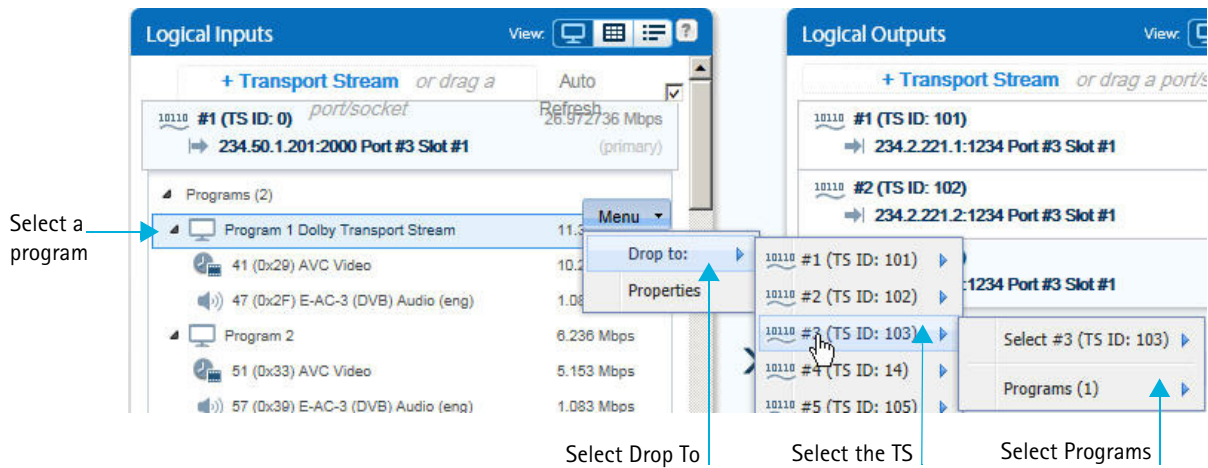


Moving a program from Input to Output Program

To move a program to an output program:

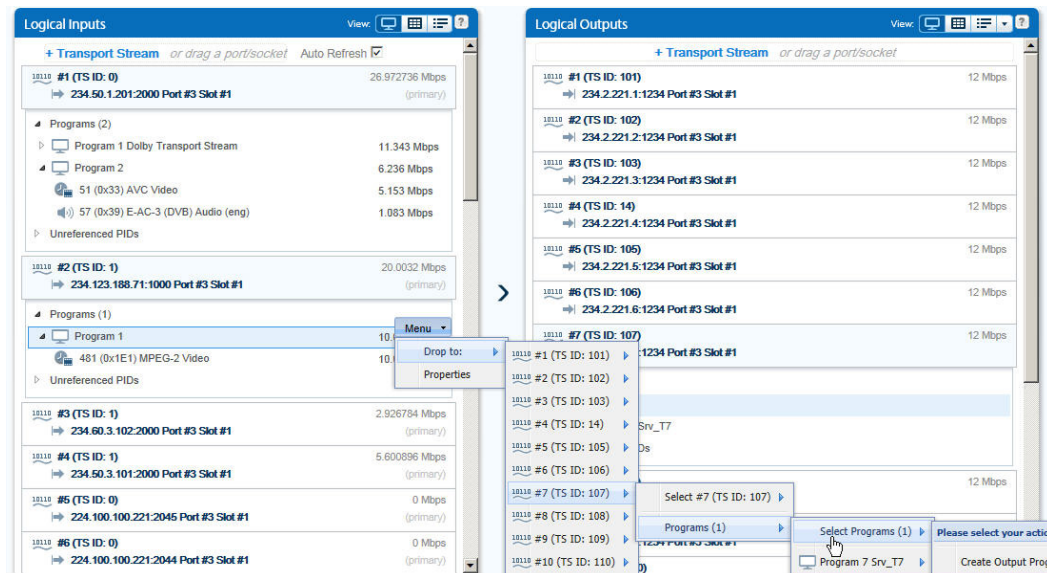
1. In the **Logical Inputs** section, select a program.
2. From the drop-down list, select **Drop To**.
A list of all the available output TSs appears.

3. Select the TS.

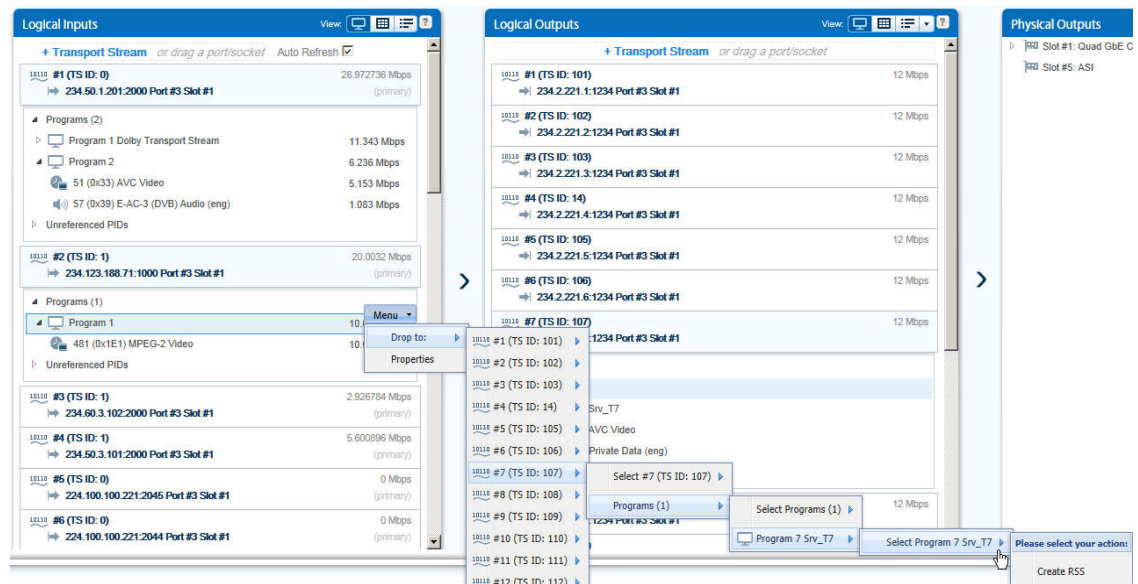


4. Do one of the following:

- ❑ **Select Programs > Create Output Program.**



- ❑ **Select Programs > select an existing program > Create RSS:**

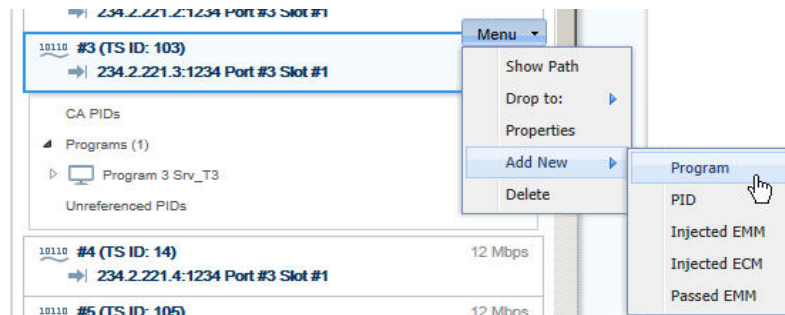


Creating a New Output Program

You can create a program at the output by selecting a TS or the program menu in the required TS.

To add a new program at the TS level:

1. In **Logical Output**, select the required TS.
2. From the drop-down menu, select **Add New > Program**.



To add a new program at the program level:

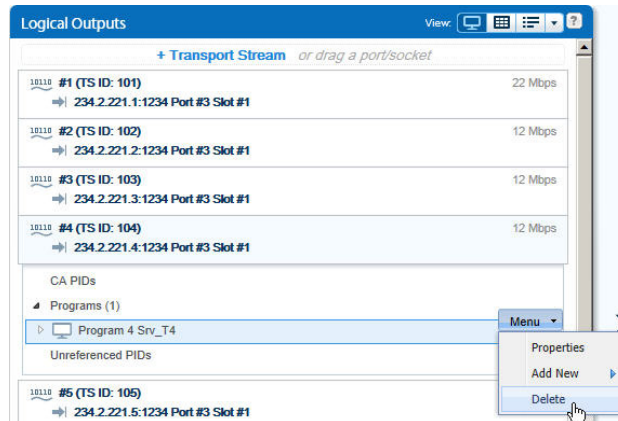
1. In **Logical Output**, select the Programs node under the required TS.
2. From the drop-down menu select **Add New**.

Removing a Program

To remove a program:

1. In **Logical Output**, select Programs node under the required TS.

- From the drop-down menu select **Delete**.



Configuring a Program

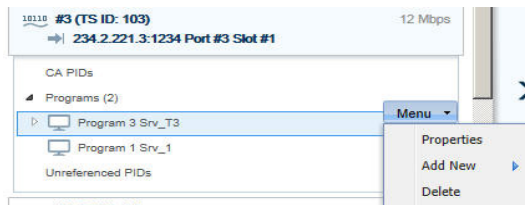
You can configure the following:

- Program properties
- Add new component

To remove a program, see [Removing a Program](#).

To configure a program:

- In the **Logical Output** section, select a program.
- From the drop-down menu, select one of the following:



- Properties - To open the Properties dialog.
- Add New - Enables you to add new components:
 - ❑ ES - Enables you to add a PID to the program. Once you have added, configure the PID as explained in [Defining PID Parameters](#).
 - ❑ Pass PCR - See [PCR PID Carried Over Input PIDs](#).
 - ❑ Pass DPI - See [Configuring Spliceable Services & SCTE35 PID](#).
 - ❑ Generate PCR - See [Configuring a PCR PID](#).
 - ❑ Generate DPI/Pass DPI - See [Configuring DPI PIDs](#).
 - ❑ Reference Program - See [Reference Service \(RSS\)](#).
 - ❑ Passed ECM - See [Configuring a Passed ECM PID](#).
- Delete - Enables you to remove a program from the TS. See [Removing a Program](#).

Configuring Program Properties

To configure program properties:

1. In the **Logical Output** section, select a program.
2. From the drop-down menu select **Properties**.

Program 3 (Srv_T3) of TS ID 103: Properties

Program Name: Srv_T3

Program Number: 3

Priority: High

PMT PID: 40 (0x28)

Service CBR: ☐

Bitrate: 3

Advanced Options

- Scrambling
- Redundancy
- PCR
- Slate
- EAS
- Splicing DPI
- ESAM
- Other

OK Cancel Save

3. Type in the required information in the following fields:
 - ☐ **Program Name** - Type in the service name, for example CNN, NBA.
 - ☐ **Program Number** - Service identification number at output port.
 - ☐ **Priority** - In Priority, define the priority for dropping services in case of overflow. The available priorities are:
 - ☐ High
 - ☐ Normal
 - ☐ Medium
 - ☐ Low

Services defined as Low are the first ones to be dropped and services with High priority are the last ones to be dropped.

- ☐ **PMT PID** - The PID over which the service's PMT (Program Map Table) is transmitted.
 - ☐ **Service CBR** - Select it to set the bitrate for Constant Bitrate. This option is enabled if transcoding is enabled.
 - ☐ **Bitrate** - Enabled if Service CBR is enabled. Enter the required bitrate of the program.
4. For advanced options, focus on the **Advanced Options** section.
 5. Click each section you need to configure and follow the provided instructions:

Scrambling

To scramble a program:

1. Click **Scrambling**

2. Configure as follows:

- ☐ **CA Descriptor Location** - Select one of the following:
 - ☐ Program
 - ☐ ES
 - ☐ Both
- ☐ **Enable BISS Option** - Enables BISS. The Control Word box is enabled.
- ☐ **Control Word** - A required Control Word with up to 12 hexadecimal characters (six bytes). The CW is required for decoding the scrambled transmission.

Defining Program Redundancy

Unlike other redundancy methods, Program redundancy is triggered by a program underflow and not by an alarm. The related alarms only indicate that a redundancy switch has taken place.

Configure the triggering condition by defining which of the following activates the redundancy switch:

- Program underflow
- Program PID underflow

To define redundancy parameters:

1. Click the **Redundancy** section.
2. Open the **Redundancy Mode** list and select one of the following options:
 - ☐ None - Program redundancy is inactivated
 - ☐ Manual - The user initiates the program redundancy switch
 - ☐ Automatic - The program redundancy switch occurs automatically according to the predefined triggers. See following step.
 - ☐ Manual Revert - The program redundancy switch occurs automatically according to the predefined triggers. However, switching back to the primary-program, when fixed, is performed manually. See [Seamless Program Substitution](#).
3. Set Number of Backups (1-3).
4. To define redundancy triggers, focus on **Triggers**.
If Manual Revert is used, configure Active Source. See [Seamless Program Substitution](#).
5. To define a redundancy trigger, focus on **PID Missing** and select either of the following:
 - ☐ PCR Missing - The redundancy switch takes place if there is a PCR PID underflow
 - ☐ At Least One PID is Missing - The redundancy switch takes place upon the under flow of at least one of the program's PIDs.

Seamless Program Substitution

Seamless Program Substitution is a Service-level local programming feature. Manual, SCTE35 and SL10 modes are supported.

To configure Seamless Program Substitution:

1. Open the menu for the required program.
2. Scroll down to **Seamless Program Substitution** and click to open the section.
3. Select **Enable**.
4. Select a mode from the drop-down list.

The available parameters change according to the selected mode.

5. If Manual is selected:
 - ❑ Set Number of Alternatives (1-2).
 - ❑ Define the active source as Primary, Alternative 1, or Alternative 2.
6. If SCTE35 is selected (Splice Insert command only):
 - ❑ Define the Event Source Range Minimum and Maximum (0-15).
 - ❑ Set Reference DPI to Remux by the relevant input.
7. If SL10 is selected:
 - ❑ Enter the SNMP Agent IP address.
 - ❑ Enter the Contact number (1-10).
 - ❑ Enter the Delay in milliseconds.

Black Frame Reduction

Black Frame Reduction is available for all versions of SPS.

To configure Black Frame Reduction:

1. Select to enable.
2. Enter or scroll to the Target VBV Delay in milliseconds.
3. Enter or scroll to the Max VBV Delay in milliseconds.



NOTE: After configuring SPS, configure alternative sources for each PID separately in PID Properties.



NOTE: Seamless Program Substitution cannot be used with Program Redundancy.

Configuring a PCR PID

Configure the PID over which the service's PCR (Program Clock Reference) is transmitted. A service may carry a PCR PID. A PCR PID can outflow according to one of the following options:

- Carried over one of the service's PIDs
- Carried over a reference service, only when a reference service is configured
- Carried over any of the incoming PIDs
- Generated PCR - PCR PID generated by the device and no input indication is required. ProStream 9100 generates a PCR PID at the output regardless of the input PCR. As a result, each output service can have its own PCR PID with a new time baseline. You can configure a PCR PID as follows. In both options, the PCR PID is output as a separate PID or over one of the ESs of the service. Usually the PCR PID is out-streamed over the video PID:
 - ❑ Each service generates its own PCR PID
 - ❑ Common PCR - A single PCR PID is common to a few services
- No ES - The PCR PID outflows as an independent PID - See Pass PCR

To define PCR parameters:

1. Click the **PCR** section.
2. To generate a PCR PID at the output, select **Generate PCR**.
3. To set the PID to outflow the PCR PID, in **Insert PCR PID**, select one of the PIDs of the program. The **Insert PCR PID** list is populated with the PIDs of the program.



NOTE: When transcoding is required, the PCR should outflow over the video PID.

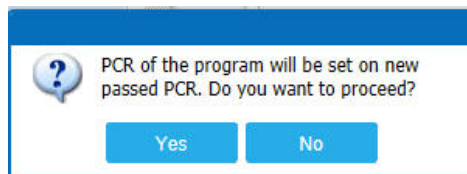
PCR PID Carried Over Input PIDs

When you pass a program from the input to the output, the PCR is usually carried over one of the PIDs of the program.

To have the PCR PID carried over another PID:

1. In the Logical Output pane, select the required program.
2. From the down-list menu, select **Pass PCR**.

The following message appears.



3. Click **Yes** to change the Passed PCR.
4. Select the newly selected PCR PID and from the drop-down menu, select **Properties**.

Configuring Slate Parameters

When a service broadcast is disrupted, the Slate (Static Apology Message) feature enables MSOs to quickly inform their subscribers of their efforts to restore the service. The Slate feature allows configuring for any service an alternative or backup input feed or source that is enabled on the output upon disruption of the primary feed.

The following table lists the Slate specifications:

Table 4–2: Slate Specifications

Specification	Explanation
Total number of Slate feeds	Up to five per device
Video format of Slate feed	Any of the following presented in MPEG transport packets: <ul style="list-style-type: none"> ■ SD MPEG2 ■ SD AVC ■ HD MPEG2 ■ HD AVC ■ AC3 2.0 ■ AAC 2.0 iK Note: Format of slate feed should match primary feed
Bitrate of Slate feed	CBR only Note: The bit rate of the alternative feed is not greater than the bit rate of the primary feed(s)
Interface	Any input to any output
Slate activation modes	The following modes are supported: <ul style="list-style-type: none"> ■ Manual - You initiate the switch from the primary feed to the slate feed ■ Automatic - Device initiates the switch based on predefined triggers

Table 4–2: Slate Specifications

Specification	Explanation
Slate Triggers	See Configuring Slate Parameters .

To configure the Slate feed:

1. In the **Logical Output** section, select a program.
2. From the drop-down menu select **Properties**.
3. Select the Slate section.

4. To enable **Slate**, click **Enable**.
5. Open the **Slate Mode** list and select one of the following options:

Table 4–3: Slate Mode

Option	Explanation
Auto	The Slate switch is performed automatically according to pre-defined triggers: <ul style="list-style-type: none"> ■ Lost of the Video PID - The Video PID drops to Zero bit-rate ■ Lost of input on the Encoders - Harmonic encoders only. The encoder stops streaming video traffic upon loss of input signal (configurable for every video PID). ProStream9100 detects a zero bit-rate at the input video. When switching to the alternative feed, ProStream remaps the components of the alternative feeds PIDs (Video, Audio) to the main channel component PIDs to ensure signal continuity on the output.
Manual	The user initiates the Slate switch
Manual Revert	The user initiates the revert

6. Open the **Slate TS** list and select the input TS that includes the slate.
7. In **Service ID** enter the Slate service ID.

Configuring EAS Parameters

Configuring the EAS service to outflow comprises two parts:

- Enable EAS for the output program
- Select the EAS program to outflow instead of the provisioned output program

To configure the EAS feed:

1. In the **Logical Output** section, select a program.
2. From the drop-down menu select **Properties**.
3. Select the EAS section.
4. To enable the EAS for the service, select **Enable**.
5. To select the EAS service (channel) for this output service, open the list and select the required channel.

Once this EAS is required, the EAS is streamed out instead of the provisioned output service. See also [Defining SNMP Parameters](#).

Enabling DPI

The DPI section contains options for enabling Digital Program Insertion (DPI, or splicing) for a service. If all splicing engines are occupied, an alarm is raised upon clicking **Apply**. For setting up a DPI-enabled service, see [Configuring Spliceable Services & SCTE35 PID](#).

To enable DPI parameters:

1. In the **Logical Output** section, select the required program.
2. In the drop-down menu, select **Properties**.
3. Select **Spliceable**. DPI options appear.
4. Select Program Name or SCTE30 Channel Name.
5. If SCTE30 Channel Name is selected, enter the channel name in the box below.
6. Select a **Reference DPI** option:
 - ☐ PID - Enter the input PID
 - ☐ ES Type - Enter the Input Program Number
 - ☐ Component ID - Input the Component ID and Input Program Number
 - ☐ None
7. Select **Enable** to engage **Black Frame Reduction**.
8. Enter or scroll to the **Target VBV Delay** in milliseconds.
9. Enter or scroll to the **Max VBV Delay** in milliseconds.
10. Click Save to save the configuration.

Event Signaling and Management (ESAM) Feature

For ESAM overview and general configuration, see [ESAM \(Event Signaling and Management\)](#).

Configuring ESAM

To configure ESAM:

1. In the **Logical Output** section, select a program.
2. From the drop-down menu select **Properties**.
3. Select the **ESAM** section.
4. To select whether the device functions as an LSS or LSP, open the **ESAM Mode** list and select one of the following:
 - ☐ None - ESAM feature is not applied.
 - ☐ LSS - The device is located at the edge of the network and is responsible for switching to

and from an alternative feed, based on BMS commands.

- ❑ **LSP** - The device is located in the Central Headend. It receives commands from BMS and processes it for receipt by the LSS.
5. If the ESAM Mode is **LSS** or **LSP**, configure the following:
- ❑ **ESAM Server** - Open the BMS Server list and select the required server that manages the blackout system. The list is populated with the ESAM servers configured in **Platform > ESAM**. See [ESAM \(Event Signaling and Management\)](#).
 - ❑ **Acquisition Point Identifier** - Enter the unique identifier of the program. This identifier is unique for each blackout zone.
 - ❑ **Zone Identifier** - Enter the identifier of the blackout zone of the program. The zone identifier and Acquisition Point Identifier together create a unique program identifier.
 - ❑ **Output DPI PID** - In LSS mode, check this option to include the DPI PID. By default the LSS does not stream the DPI PID containing the ESAM information. When this option is selected, the LSS streams the DPI PID.
 - ❑ **Timestamp Descriptor** - In LSP mode, check this option to include a timestamp descriptor.
 - ❑ **Remux by** - Read only. For ESAM purposes the DPI PID from the input is carried by PID only.
 - ❑ **Input DPI PID** - Select the input PID that carries the DPI PID.
 - ❑ **Stamp Splice Time** - Check the box in order to enable.
 - ❑ **Splice Insert** - Select the option required for SCTE35 operations for the service:
 - ❑ Always pass
 - ❑ Always discard
 - ❑ POIS (Fallback: Discard)
 - ❑ POIS (Fallback: Pass)
 - ❑ **Time Signal** - Select the operation required for SCTE35 operations for the service:
 - ❑ Always pass
 - ❑ Always discard
 - ❑ POIS (Fallback: Discard)
 - ❑ POIS (Fallback: Pass)
6. Click **OK**.

Emergency Switch to Main

The main service can be reinstated manually by clicking on Emergency Switch to Main in the ESAM section. This button can be used in the event of a switching failure as well as under normal operating conditions.



NOTE: The Emergency Switch to Main button can also be found at **Platform>ESAM>Emergency Switch**

Configuring Other Program Parameters

Select whether the PAT table includes a reference to the PMT table.

To configure a reference in the PAT:

1. In the **Logical Output** section, select a program.
2. From the drop-down menu select **Properties**.
3. Select the **Other** section:
4. Open the **Reference Program in PAT** list and select either of the following:
 - ☐ Always
 - ☐ If Referenced in Input
5. When **If Referenced in Input** is selected, select the following:
 - ☐ Input TS (by TS ID)
 - ☐ Input Service

Reference Service (RSS)

The Reference Service feature enables an output service to automatically update according to changes detected on a specific input service. The input service is called “Reference Service”.

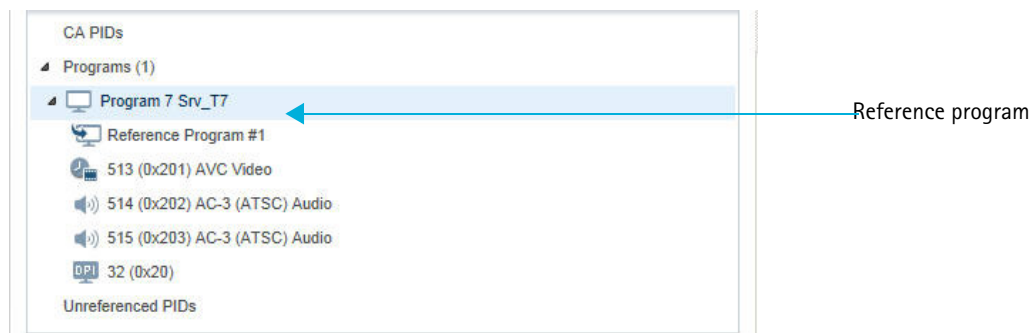
The Reference Service option allows ProStream to support two main applications:

- MHP - (Multimedia Home Platform). This standard enables streaming data for interactive TV applications.
- ASM (Automatic Service Mode) - You can choose to pass a service from the input to the output without specifying the exact PIDs of this service.



NOTE: RSS Provisioning mode may not be used for “Virtual Channel” purposes.

You can add a new reference service only to a service. The service becomes a parent service as the following picture shows:



ProStream dynamically aggregates the PIDs and descriptors of multimedia (audio/video) services with the data PIDs and descriptors of one or more MHP Services which are received from an MHP server that plays them out.

Any changes in the MHP services do not affect the stable streaming of the content of the parent service.

A service that includes reference services may also include explicitly defined ESs, just like any regular service. The PCR of such a service may be carried on an explicitly-defined ES, or on an ES that is part of the reference service. In the latter case, the reference service that includes the PCR stream is marked as Carry PCR. See also [Configuring a PCR PID](#).



NOTE: Unless Generate PCR is activated, RSS provisioning using a common PCR PID requires passing the PID to the output manually, while maintaining the original PID number.

To provision a New Reference Service:

1. In the **Logical Output** section, select a program.
2. From the drop-down menu select **Add New > Reference Program**.
A reference program is added.
3. To configure the RSS, select the RSS and from the drop-down menu select **Properties**.
4. Open the **Input** list and select the required input port. This is the port through which the reference service is streamed into the device.
5. In **Input Program Number**, type the ID of the required input program. This is the ID of the reference service.
6. **PID Remapping** - PID remapping allows to remap the PIDs of the reference service and to set the PID range. You can select either of the following:
 - ☐ **Range** - Once you have selected **Range**, in **First PID** and **Last PID**, enter the first and last PID of the PIDs range, respectively. In **Total number of PIDs in Range**, check the number of PIDs included in the range.
 - ☐ **Preserve** - To maintain the PIDs as in the input, disable the **Remap PID** option.
7. **PID Filtering** - Applies to EDU only. When the device functions as an EDU, in **PID Filtering** enter the component descriptor that should be ignored. You can indicate up to five components to be ignored.
8. **PID Priority** - Define the priority for dropping PIDs in case of overflow. PIDs defined as Low are the first ones to be dropped and PIDs with High priority are the last ones to be dropped. The available priorities are:
 - ☐ As Parent
 - ☐ High
 - ☐ Normal
 - ☐ Medium
 - ☐ Low



NOTE: RSS provisioning cannot be used for services with a common PMT PID.

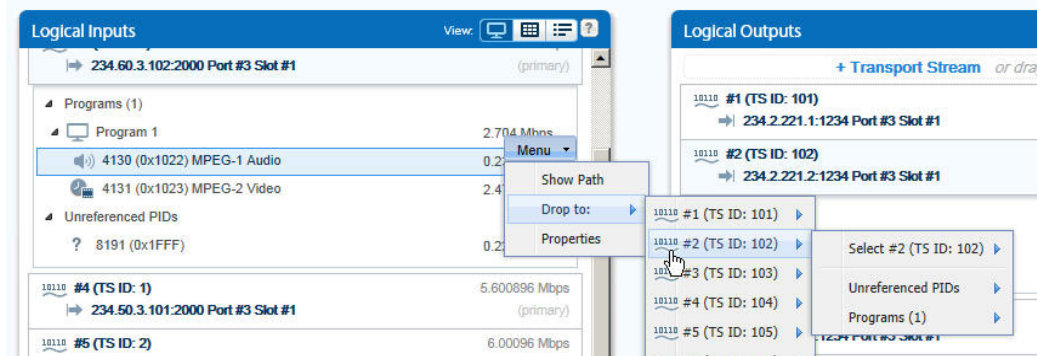
Provisioning/Multiplexing PIDs

This section instructs you on how to provision PIDs. You can add a single PID or a range of PIDs. You can add a PID to a program or in case of a ghost PID, select a TS.

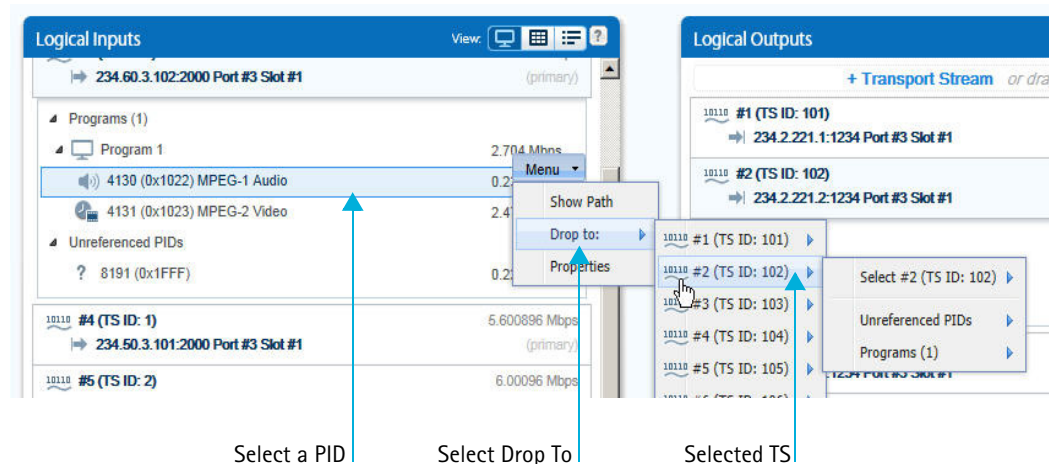
To add an Input PIDs to an Output TS (Ghost PIDs):

1. In **Logical Input**, select the PID you wish to move.
2. From the drop-down list, select **Drop To**.

A list of available output TSs appear.



3. Select the required TS.
4. Select one of the following options:
 - ☐ Select TS number > Add to TS
 - ☐ Unreferenced PIDS > Add to TS
 - ☐ Program # > Add to Program



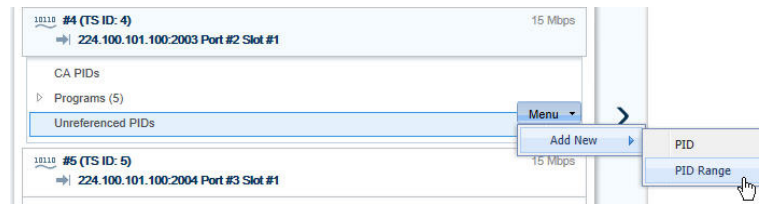
The PID is added according to your choices.

Creating a Range of PIDs

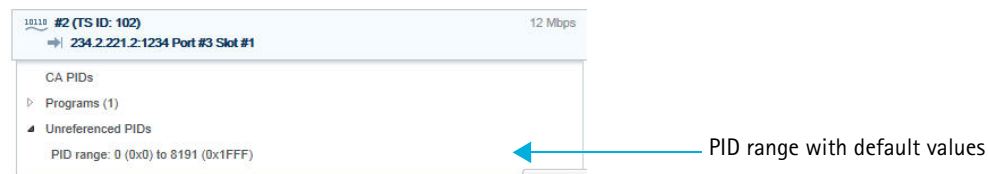
To create a range of PIDs:

1. Create the PID range logically using one of the two following methods:
 - ☐ In Logical Input, select the required TS and drag it to the Logical Output.
 - ☐ Do one of the following:
 - ☐ Select **Create PID Range**. A PID range is added to the Unreferenced section of the selected output TS.

- ❑ In Logical Output, select **Unreferenced PIDs** > **Add New** > **PID Range**.



A new PID range appears with a default value of 0x0 - 0x1FFF.



This value indicates a range that includes all the PIDs of the input TS. If you intend to provision all of the PIDs, verify that under **TS > Tables**, none of the tables are selected to prevent table override. However, you can configure the required PID range as well.

2. Select the PID Range and from the drop-down list, select **Properties**.
3. In **Input**, select the required Input port and socket.
4. Define the PID range by entering:
 - ❑ **First Input PID**.
 - ❑ **Last Input PID**.
5. To remap, enter in **First Output PID** the first PID.

The last remap PID is automatically calculated once you click out of the **First Output PID** box.

Defining PID Parameters

To define PID parameters:

1. Select the required output PID.
2. From the drop-down list, select **Properties**.
3. In **Output PID**, enter the ID of the output PID.
4. In **ES Type**, enter the ES type of the output PID
5. In **Transcoding**, select to enable transcoding. The Transcoding Configuration appears in the dialog.
6. In **Remux Mode**, select one of the following options:
 - ❑ **PID** - Allows you to multiplex a PID that is identified according to the input TS, service and PID. (see picture above)
 - ❑ **Component** - Allows you to multiplex a PID that is identified according to the input TS, service and component. That is, one of the component descriptors has the indicated component ID.
 - ❑ **ES Type** - Allows you to multiplex a PID that is identified according to the input TS, service

and ES type. If the ES is an audio PID, you can then select the required language.

7. In **Input TS**, open the TS list and select the required TS.
8. In **Input Program Number**, select the required input program number.
9. Continue according to the Remux Mode as described in the following table:

Remux Mode	Configuration
PID	In PID, enter the required input PID
Component	Component ID, enter the required component ID
ES Type	In ES Type, enter the required ES type. If it is an audio PID, select in Language the required language.

10. **Reference PCR Input PID** - Select the required PCR PID. The latter is a baseline for the generation of the PCR at the output.

PID Advanced Options

To define PID advanced options:

1. In the **PID Properties** dialog box, in the **Advanced Options** section, click **Redundancy Triggers**.

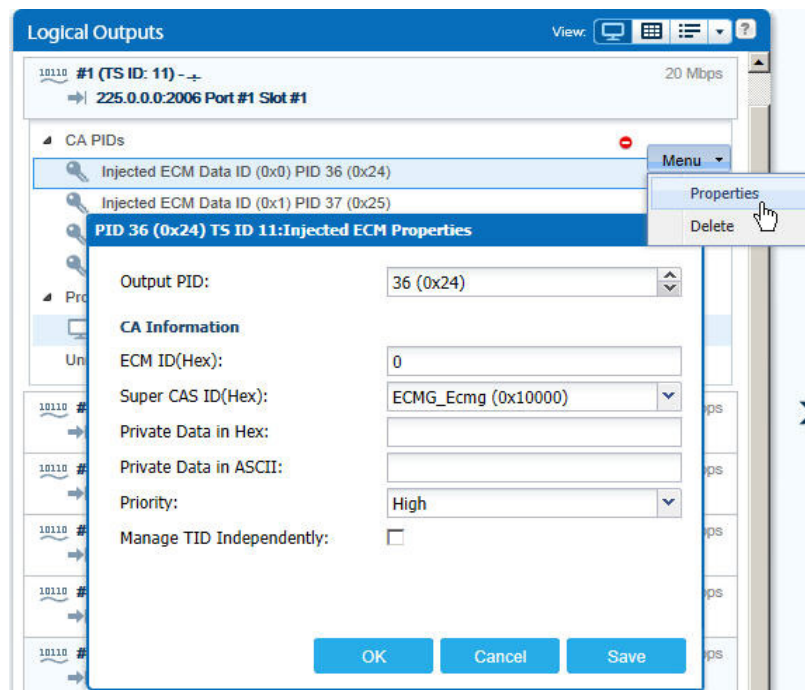
The default trigger is PID underflow. You can configure each routed PID (ghost, EMM, ECM, ES and PCR not of ES) to be monitored for PID underflow.



NOTE: PID underflow does not apply to DPI PID and for regenerated tables and PID range.

2. To enable PID Underflow as a trigger, select **Enable**.
3. Under **Minimum Bitrate Allowed (Mbps)**, select the minimum allowed bitrate.
If the bitrate goes below this threshold, a redundancy switch takes place. The default is 0.05 Mbps.
4. Click the **PCR** section.
5. Open the Mode list and select one of the following:
 - ☐ **Follow Input** - PCR configuration follows the input.
 - ☐ **Remove** - PCR is removed from the PID.
 - ☐ **Insert** - Under service, **Generation Mode** is enabled and you can configure the PID to carry the PCR.
6. Click on the **Advanced** section.
7. Select **CC Restamping**.
8. From the **PID Priority** dropdown list, select one of the following to set the priority for dropping PIDs in case of overflow. PIDs with High priority are the last ones to be dropped and Low are the first to be dropped.
 - ☐ Follow Program
 - ☐ High
 - ☐ Normal
 - ☐ Medium
 - ☐ Low
9. In the **Presence Detection** section, the alarm *PID Missing* is raised when the Threshold radio button is selected. By default this button is selected.
10. From the **Scrambling Override** drop-down list, select one of the following options:
 - ☐ None - follows the scrambling configuration of the TS or service
 - ☐ Always Scramble - even if TS or service are not scrambled, the PID is scrambled as long as a fixed key or a CW is provided. For future use only.
 - ☐ Always Clear- even if TS or service are scrambled, the PID is always clear.
11. For a video PID in a transcoded service, select the Transcoding check box. See [PCR and Video Transcoding](#).
12. For an ECM PID, click **CA PIDs** > select the required ECM PID.

13. From the drop-down menu, select **Properties**.



14. Output PID - Select the required PID number.

15. To configure CA related parameters, focus on **CA Information** section.

- ❑ **ECM ID (Hex)** - Type in the ECM ID as provided by your CAS vendor. The ECM ID is a unique headend ID.
- ❑ In **Super CAS ID (4 Digits)**, enter the required ID. It is a 32-bit identifier that contains the CAS ID and ECMG ID. The CAS vendor provides this value.
- ❑ In **Private Data**, enter a string of up to 100 bytes that is added to the CA descriptor. You can enter it either in ASCII or in Hex by selecting either **ASCII** or **HEX**.
- ❑ In **Priority**, configure the ECM PID priority in case of overflow. Priority values range from High to Low.
- ❑ **Manage TID Independently** - When selected, ProStream 9100 manages the ECM table ID independent of the CP (Control Period).



NOTE: A CA descriptor is automatically added.

Configuring PID Descriptors

Configuring PID descriptors comprises two steps:

- Tracking input descriptors - enables ProStream to track changes in input of the descriptor as well as moving the descriptor from input to output. Once you select this option, you can select PIDs to be filtered. See [Tracking Input Descriptors at the PID Level](#).
- Assigning descriptors to the PID. See [Adding PID Descriptors](#).

Tracking Input Descriptors at the PID Level

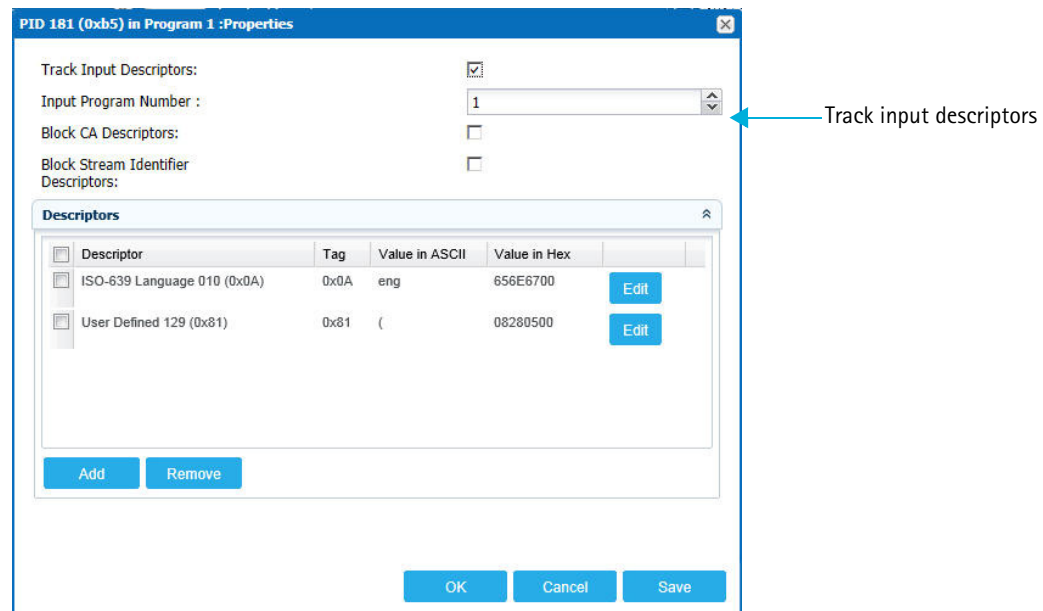
To track input descriptors at the PID level:

1. In Logical Output switch to **Table** view.



2. Drill down to the required PID and from the drop-down menu select **Properties**.
3. To track input descriptors, select **Track Input Descriptors**. You can track changes in input of the descriptor and to allow moving the descriptor from input to output. When you select this option, you can select PIDs to be filtered.

The dialog box is updated with the options of track input descriptors:



4. In Tracking Input Descriptors section:
 - ❑ **Input Program Number** - Enter the input service ID that carries the PID to enable tracking and/or filter its descriptors.
 - ❑ **Block CA Descriptor** - Select to remove the input CA descriptor from the output PID of the service.
 - ❑ **Block Stream Identifier Descriptor** - Select to remove the input Stream ID descriptor from the output PID of the service.



NOTE: To filter descriptors at the TS level, see [Filtering a Descriptor at a TS Level](#).

Adding PID Descriptors

To add PID Descriptors:

1. In Logical Output, switch to **Table** view.

2. Drill down to the required PID and from the drop-down menu select **Properties**.
3. To add a descriptor to the original PID, click **Add**.
4. Open the **Descriptor** list and select the required descriptor. The list of descriptors comprises the following:

Table 4–4: Descriptors in Descriptor Tag List

Listed Descriptors	Explanation
Pre-defined descriptors	<ul style="list-style-type: none"> ■ Registration descriptor ■ Language descriptor ■ Platform descriptor ■ Integrated signaling descriptor
User Defined Descriptors	This section includes descriptors that you need to define by entering the descriptor details in hexadecimal. See Standard ES Types and Descriptors .

5. Configure the descriptor as required. Typically, enter in **Value in Hex**, the required value.
Depending on the descriptor, configure the following:
CA descriptor:
 - ☐ In **CAS ID (4 Digits)**, enter the required ID
 - ☐ In **CAS PID**, select the required CAS PID
 - ☐ In **Private Data**, enter a string of up to 100 bytes that is added to the CA descriptor. You can enter it either in ASCII or in Hex by selecting either **ASCII** or **HEX**.
 Registration descriptor:
 - ☐ In **Format Identifier**, enter the required format identifier
 - ☐ In **Additional Identification Info**, enter the additional information.
6. Click **OK**. The descriptor is added to the list in the **PID Properties** dialog.



NOTE: The configured CA descriptors is automatically added when creating an ECM PID.

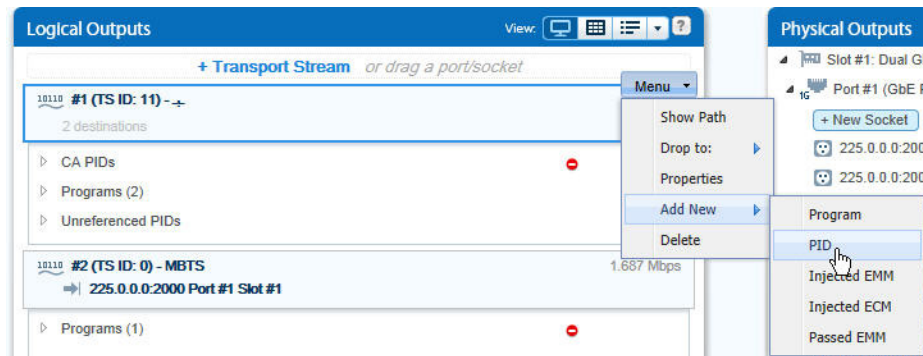
Adding Ghost PIDs to the TS

Ghost PIDs are independent Elementary Streams (ES) that are not associated with any service. The ghost PID configuration enables you to transfer and remap PIDs as well as relocate their destinations. You may also remap Ghost PIDs to new PIDs as long as they do not conflict with previously configured components.

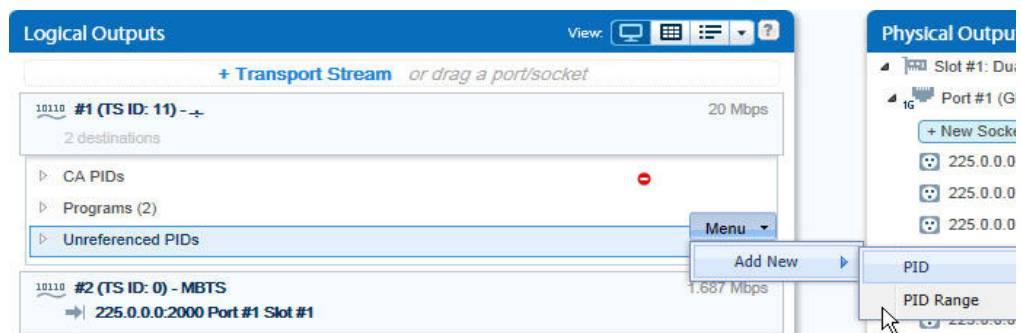
To add ghost PIDs to the TS:

1. In Logical Output, select an Output TS.
2. Do either of the following:

- From the drop down menu of the TS, select Add PID, or



- Click the TS and select the unreferenced PIDs and from the drop down menu select to add either a PID or PID Range.



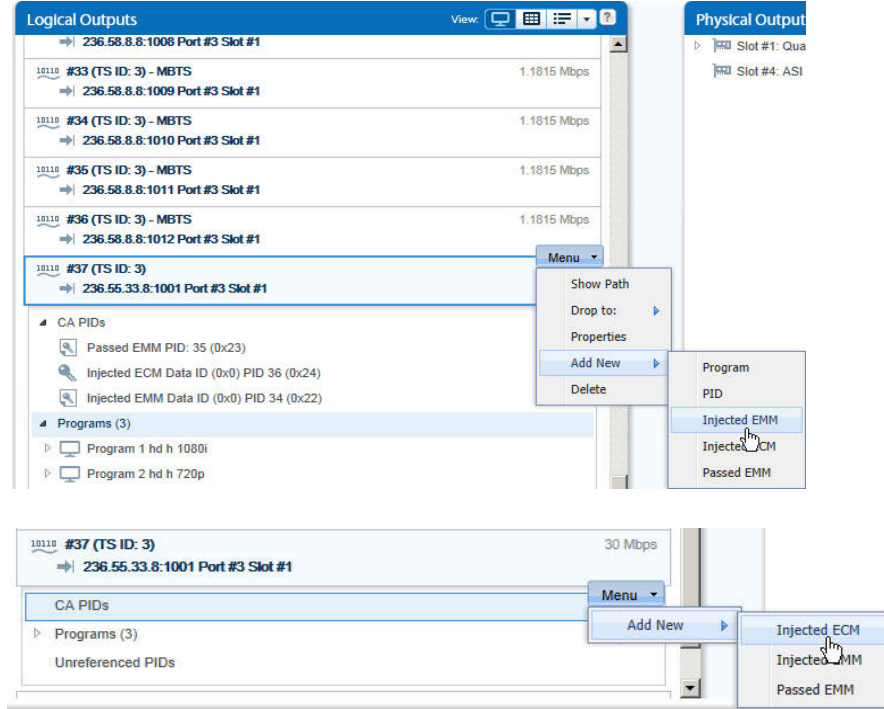
3. Select the PID or PID Range and from the drop-down menu, select **Properties**.
4. Configure as explained in [Creating a Range of PIDs](#) and in [Defining PID Parameters](#).

Adding and Configuring ECM PIDs to the TS

To add and configure ECM PIDs to the transport stream:

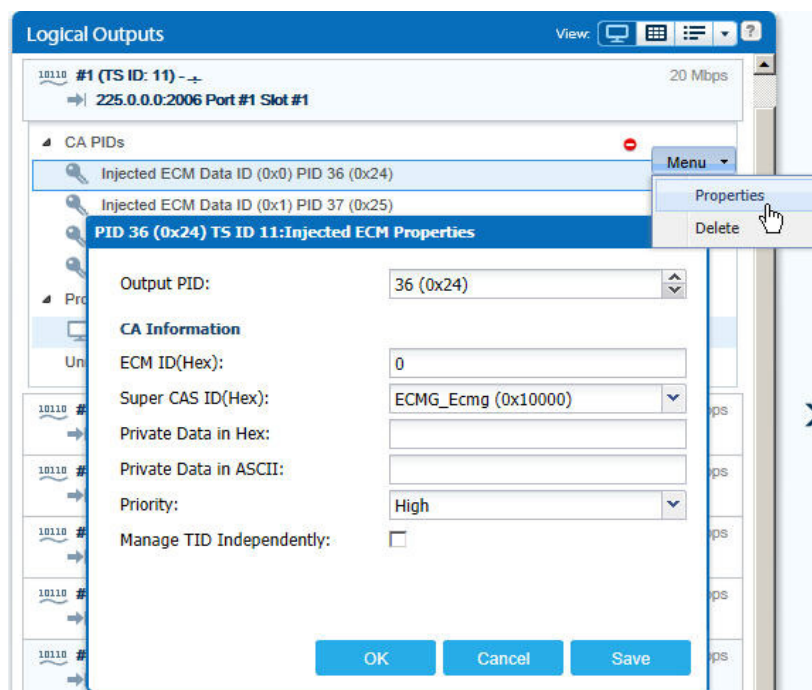
1. In Logical Output, select an Output TS.
2. Do either of the following:
 - From the TS drop-down menu, select **Add NEW > Injected ECM**
 - From the drop-down menu of the **CA PIDs**, select **Add New > Injected ECM**

- From the drop down menu of the TS, select **Injected ECM**



The newly added ECM PID appears under CA PIDs.

3. To allocate the ECM PID, configure the CA information. Click **CA PIDs** and select the required ECM PID.
4. From the drop-down menu, select **Properties**.



5. Output PID - Select the required PID number.
 - ❑ To configure CA related parameters, focus on **CA Information** section.
 - ❑ In ECM ID (Hex), type in the ECM ID as provided by your CAS vendor. The ECM ID is a unique headend ID.
 - ❑ In **Super CAS ID (4 Digits)**, enter the required ID. It is a 32-bit identifier that contains the CAS ID and ECMG ID. The CAS vendor provides this value.
 - ❑ In **Private Data**, enter a string of up to 100 bytes that is added to the CA descriptor. You can enter it either in ASCII or in Hex by selecting either **ASCII** or **HEX**.
 - ❑ In **Priority**, configure the ECM PID priority in case of overflow. Priority values range from High to Low.
 - ❑ Select **Manage TID Independently** to have ProStream 9100 manage the ECM table ID separately from the CP (Control Period).



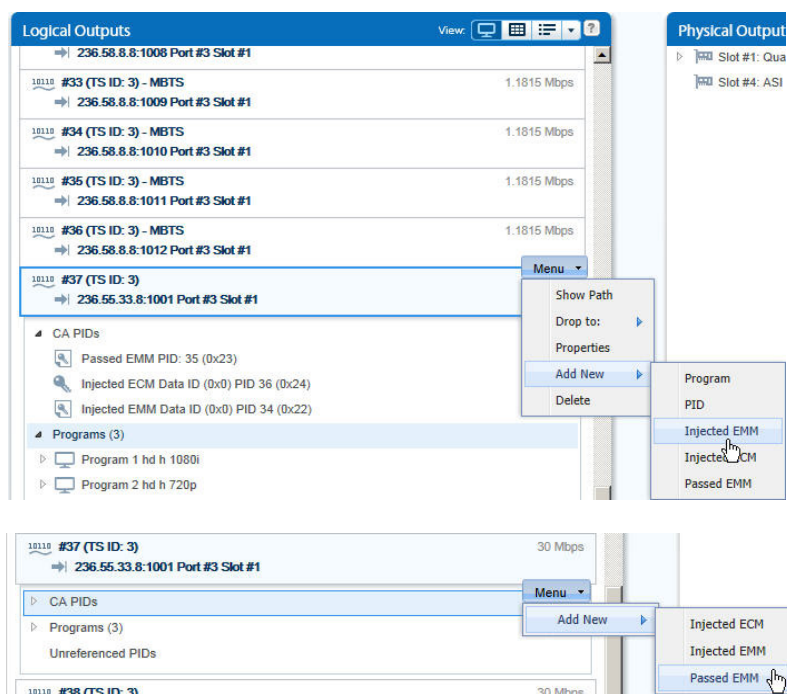
NOTE: A CA descriptor is automatically added.

Adding and Configuring EMM PIDs to the TS

You can add an EMM at the output or pass an EMM from the input.

To define EMM PID parameters:

1. In Logical Output, select an Output TS.
2. Do either of the following:
 - ❑ From the drop-down menu of the **CA PIDs** select **Add New > Injected EMM**
 - ❑ From the drop down menu of the TS, select **Injected EMM** or **Passed EMM**



The newly added EMM PID appears under CA PIDs.

3. To allocate the EMM PID, configure it. Select it and from the drop-down menu, select **Properties**.

Injected EMM

Passed EMM

Configuring an Injected ECM PID

To configure an injected ECM PID:

1. Configure the Output PID of the EMM PID. Define the PID you allocate for the EMM, in other words, the PID that carries the EMM.
2. **Maximal Bitrate** - Applies to injected EMM only. Define the maximum bitrate for the EMM PID.
3. Configure the CA parameters:
 - ❑ Client/Super CAS ID - A four-byte integer that contains the CAS ID and EMMG identifier. The CAS vendor provides this value.
 - ❑ Backup Client/Super CAS ID - A four-byte integer that contains the CAS ID and EMMG identifier. The CAS vendor provides this value.
 - ❑ Private Data (Hex) - A string of up to 100 bytes that is added to the CA descriptor. The Private Data in ASCII is updated.
4. In **PID Priority**, configure the ECM PID priority in case of overflow. Priority values range from High to Low.

To stop sending EMM with the output stream, delete the EMM PID via the Stream Config page. Deleting EMMGs only (via the EMMG page) does not stop the EMMs from flowing with the output stream.

Configuring a Passed ECM PID

To configure a passed ECM PID:

1. **Output PID** - Configure the output PID of the ECM PID. Define the PID you allocate for the ECM, in other words the PID that carries the ECM.
2. Under **Source** configure the following:
 - ❑ Input TS - Select the input TS
 - ❑ Input PID - Select the input PID
3. Configure the CA parameters:
 - ❑ CAS ID - Enter a 16-bit CAS vendor ID.

- ❑ Private Data (Hex) - A string of up to 100 bytes that is added to the CA descriptor. The Private Data in ASCII is updated.
- 4. Click **Advanced** and configure the following:
 - ❑ **PID Priority** - Configure the EMM PID priority in case of overflow. Priority values range from High to Low
 - ❑ **Presence Detection** - When selected, the alarm *PID Missing* is raised. By default this box is checked.

Configuring DPI PIDs

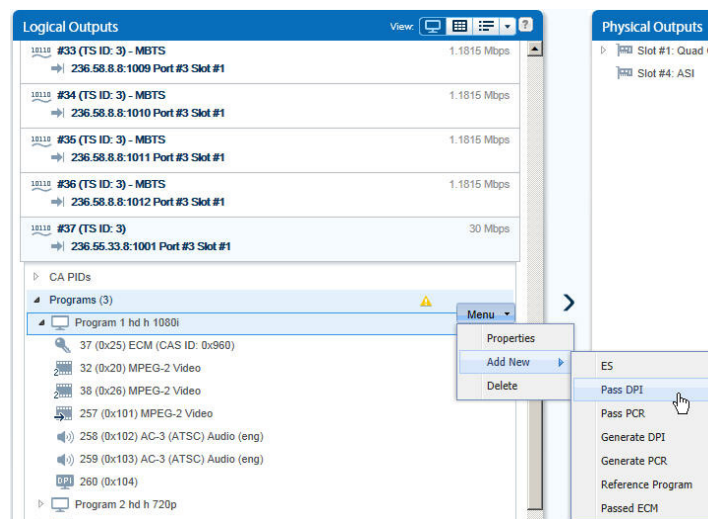
You can configure either of the following DPI PIDs:

- Passed DPI PID - If a DPI PID is streamed into the device. See [Configuring a Passed DPI](#).
- Generate DPI PID - When ProStream receives a trap/analog CUE tone it can generate SCTE35 CUE with a splice insert message and inject it to the output stream. See [Configuring Generate DPI PID](#).

Configuring a Passed DPI

To configure a passed DPI:

1. In the web client, in Logical Output, select the required program.
2. From the drop-down menu, select **Add New > Passed DPI**.



A DPI PID is added to the program.

3. Select the Passed DPI PID from the drop-down menu select **Properties**.
4. Fill in the following:
 - ❑ **Output PID** - Enter the output PID number.
 - ❑ **ES Type** - View the ES type of the DPI PID. Typically it is 0x86, SCTE35.
 - ❑ **Reference PCR Input PID** - Select the required PCR input PID.
 - ❑ **Remux Mode** - Contains the following options:
 - ❑ **None** - Do not register to receive any SCTE35 messages.
 - ❑ **PID** - Identify and register the DPI PID according to its PID ID. Once you select PID, the PID box appears. In the PID box, enter the required PID number.

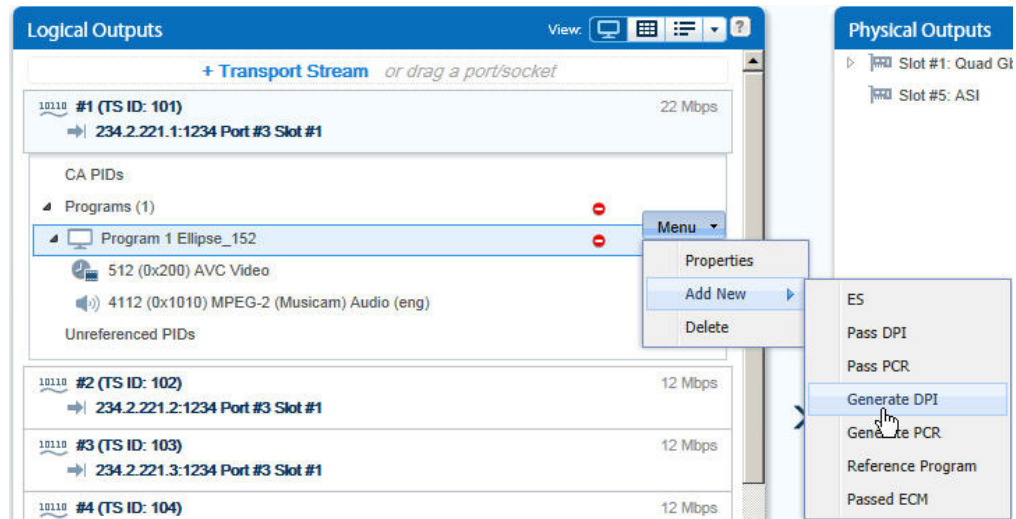
- ❑ **ES Type** - Identify and register the DPI PID according to its ES Type. Usually the SCTE35 PID is type 0x86.
 - ❑ **Component** - Identify and register the DPI PID according to the required component parameters. Once you select Component, the **Service** and the **Component** boxes appear. Enter the required service details and the required component ID.
- 5. **Input PID** - Select the input PID.
- 6. In **Advanced** Options, configure how to coordinate between network PIDs and AD server PIDs, open the **Ad PID Selection Policy** list and select one of the following options:
 - ❑ **Replace (Fallback: Block)** - Try to match Ad PID to network PID. If a matching PID is not found, block the network PID.
 - ❑ **Replace (Fallback: Play)** - Try to match Ad PID to network PID. If a matching PID is not found, play the network PID.
 - ❑ **Always Play Network PID** - Do not try to match Ad PID to network PID. Always play the network PID.
 - ❑ **Block PID During Ad** - Do not try to match Ad PID to network PID. Always block the network PID.
- 7. In **Advanced**, configure as follows:
 - a. **C Restamping** - Select the CC Restamping box to enable this option.
 - b. **PID Priority** - Define the priority for dropping PIDs in case of overflow. PIDs defined as Low are the first ones to be dropped and PIDs with High priority are the last ones to be dropped. The available priorities are as follows:
 - ❑ As Parent - Either TS or service, according to the parent stream.
 - ❑ High
 - ❑ Normal
 - ❑ Medium
 - ❑ Low
 - c. **Scrambling Override** - Open the list and select one of the following options:
 - ❑ None - Follows the scrambling configuration of the TS or service.
 - ❑ Always Scramble - Even if TS or service are not scrambled, the PID is scrambled as long as a fixed key or a CW is provided. For future use only.
 - ❑ Always Clear - Even if TS or service are scrambled, the PID is always clear.

Configuring Generate DPI PID

To configure or generate a DPI PID:

1. In the web client, in Logical Output, select the required program.

- From the drop-down menu select **Add New > Generate DPI**.



A DPI PID is added to the program.

- Select the generated/Passed DPI PID and from the drop-down menu select **Properties**.
- Output PID** - Enter the output PID number.
- ES Type** - View the ES type of the DPI PID. Typically it is 0x86, SCTE35.
- SL 10 SNMP Agent IP** - Select the IP address of the agent to generate splicing requests.
- SL 10 Contact Number** - Select the required contact number.
- DPI Delay** - Select a delay for the DPI PID.
- Splice Return Mode** - SCTE35 indicates splice duration time:
 - ☐ Enable Duration
 - ☐ No Duration
- Command** - SCTE35 indicates splice time:
 - ☐ Not immediate
 - ☐ Immediate
- Avail Duration** - Enabled if Enable Duration is selected in Splice Return Mode. Select the time slot for inserting content into the network feed.
- Avail** - Indicates the avail time.

Configuring the Output Port

The available output ports are as follows:

- ASI - Outputs one TS.
- GbE - Outputs up to 128 TSs.

Each output port has its own unique configuration parameters. The following section guides you on how to configure each output port.

Configuring an ASI Output Port

The ASI output port requires you to set the required bit rate and to enable the output port.

To configure an ASI output port:

1. In the Physical Outputs pane, select the required ASI out port.
2. From the drop-down menu, select **Properties**.
3. Check the **Enable** box to enable the ASI port.
4. In **Port Description**, enter a short description.
5. In **Source TS**, enter the source TS.
6. In **Bitrate (bps)**, type in the required bit rate (bits per second) of the TS.
7. To define packet size, select **Packet Size**:
 - ☐ 188 - default
 - ☐ 204
 - ☐ Auto - the device automatically detects the packet size.
8. Select **Disable Scrambling** to enable clear streaming on this port.
9. Click **Shutdown Port when Input is Missing** to enable the feature on this port.



NOTE: If you use scrambling over ASI, you may only select 188 (default) and 204 for the output packet size.

Configuring a GbE Output Port

Configuring a GbE Output port requires setting the port mode at the card level as well as properties at the port level itself.

To set configure a GbE Output Port:

1. In the **Physical Outputs** pane, right-click the slot with the required GbE card and select **Properties**.
2. Pairs of ports (1&2 and 3&4, if available) can work independently or in one of four redundancy schemes. The ports are configured as follows:
 - ☐ Open the appropriate **Redundancy** list and select the output mode required.
 - ☐ If Manual redundancy is used, select the port to be Primary or Backup. You can select either of the following:
 - ☐ Off (Independent)
 - ☐ Hot-Standby
 - ☐ In the **Advanced** section, select the **Card Ports Mode**. You can select either of the following:
 - ☐ Port 1 + 2: 1 Gbps
 - ☐ Port 2: 10 Gbps (if available)

Note the following regarding port redundancy:

- ☐ Port redundancy is disabled for Ports 1&2 when Port 2 is in 10Gbps mode.
- ☐ By default, Port 1 is the primary port and Port 2 of the same IOM module is the backup port.
- ☐ Triggers for a port redundancy switch include: *Missing PID, Zero Bitrate (Cable Disconnect, Socket Loss), PAT/PNT Missing, CC Error*.

3. Click **Save** to send the configuration to the device.
4. Click **OK** to close the box.
5. Click on the tree icon on the left of the slot to display the ports available.
6. Right-click on the port required to display the port's **Properties** dialog box.
7. Select the **Enable** check box to enable the port.
8. In **Description**, enter a short description.
9. Check **Autonegotiation** to enable the feature on this port.
10. Check **Shutdown Port when Input is Missing** to enable the feature on this port.
11. Check **Loopback** to enable this feature.
12. Click **OK** to save the configuration

The following table lists supported redundancy modes:

Parameter	Explanation
Manual	The redundancy switch is performed manually. The Active Port parameter appears and you can set the active port.
Automatic	The redundancy switch is performed automatically upon port failure. Once the primary is faulty, the device automatically switches to the backup port and continues transmitting content over this port unless it is faulty. The device switches to the primary port only when the backup fails.
Manual Revert	The redundancy switch occurs automatically upon port failure. However, switching back to primary, when fixed, is performed manually. To revert back to the primary port, change Port Usage to Automatic. Once the primary port is active, change Port Usage to Manual Revert.
Automatic Revert	The redundancy switch occurs automatically upon port failure. However, the device automatically switches to primary when the primary has stabilized and even though the backup is still in order. The baseline is that the primary is preferred.

8VSB Modulation

ProStream supports 8VSB modulation cards that enable reception of ATSC terrestrial TV. See [Viewing/Setting Card Parameters](#).

ProStream 9100 supports the following applications with 8VSB modules:

- 8SVB input streams transcoded and output over ASI/GbE output ports. See [Video Transcoding](#).
- 8SVB input streams multiplexed and output over ASI or GbE output ports with PCR generation at the output. See [Configuring a PCR PID](#).

Chapter 5

Broadcast Transcoding

Overview

This version of ProStream 9100 with ACE™ (Agile Compression Engine) enables you to transcode video and audio PIDs. This version of ProStream 9100 supports both broadcast and multiscreen output streams simultaneously.

Video Transcoding

This version of ProStream 9100 transcodes up to 20 HD or up to 60 SD services, including:

- High Definition (HD) MPEG2/H.264 services to HD MPEG2/H.264 services
- Standard Definition (SD) MPEG2/H.264 services to SD MPEG2/H.264 services
- Downconversion HD MPEG2/H.264 services to SD MPEG2/H.264 services
- Microsoft Picture in Picture (PIP) - HD/SD MPEG2/H.264 services to PIP H.264 services. Microsoft PIP is a low resolution service that complies with Microsoft PIP specifications.

Table 5–1: Possible Combinations of HD and SD Services per Transcoding Card

SD	HD/Downconversion (HD to SD)
15 services	None
12 services	1 service
9 services	2 services
6 services	3 services
3 services	4 services
None	5 services

Video Transcoding Procedure

You can transcode either of the following:

- HD/SD service
- PIP service

Transcoding an HD/SD Service

The following section instructs you on how to transcode an HD/SD service using the web client of the ProStream 9100 transcoder. The following table lists the required configuration to allow the transcoding of the video PID of a service:

Table 5–2: Transcoding Required Configuration

Feature	Input Stream	Output Stream	Explanation
Video Format	HD/SD	HD/SD	Supports: <ul style="list-style-type: none"> ■ High Definition (HD) ■ Standard Definition (SD) ■ Downconversion from HD to SD
Stream Type	H.264/MPEG2	H.264/MPEG2	Inputs H.264/MPEG2 and transcodes to H.264/MPEG2 In downconversion, output is MPEG2 only.
Resolution	N/A	<p>Horizontal Resolution:</p> <ul style="list-style-type: none"> ■ HD <ul style="list-style-type: none"> □ 720p - Supports 1280x720, 960x720 Converts any to any of the supported types. □ 1080i - Supports 1920x1080, 1440x1080, 1280x1080 <p>Converts any to any of the supported types</p> <p>Horizontal Resolution supports both 50 and 60Hz</p> <p>Vertical Resolution - no conversion, follow input ■ SD <ul style="list-style-type: none"> □ PAL 50Hz - Supports 720/704/640/544/528/480/352 X 576 Converts any to any of the supported types □ NTSC 60Hz - Supports 720/704/640/544/528/480/352 X 480 <p>Converts any to any of the supported types</p> </p>	<ul style="list-style-type: none"> ■ HR - if input is 720p, transcodes any 720p supported type to any 720p supported. If input is 1080i, transcodes any 1080i supported type to any 1080i supported type. ■ If input resolution changes, and: <ul style="list-style-type: none"> □ Output resolution is Follow Input, the output resolution changes accordingly without service interruption assuming that no gaps are created at the input. □ Output resolution is configured to a certain resolution, the output resolution remain as output configured resolution. ■ Downconversion - Any supported input HD resolution to any supported SD output resolution. Default output resolution: 720p. ■ VR - Follow input only. Unsupported VR conversion. <p>Note: Downconversion - Output Vertical resolution is automatically set according to the input frame rate:</p> <p>480 - In 60hz 576 - In 50hz</p>

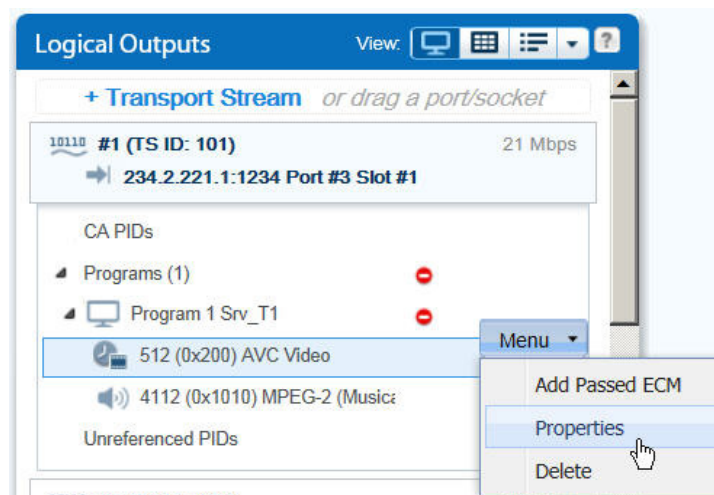
Table 5–2: Transcoding Required Configuration

Feature	Input Stream	Output Stream	Explanation
Aspect Ratio	N/A	Follow input 16:9 4:3	Allows to match picture to type of screen, standard or wide screen. See Table 5-5 .
Bit rate	N/A	CBR VBR	See Defining Output Bitrate of a Transcoded Service .
User Data	N/A	AFD Closed caption Other data	Allows to select which user data to output with the video PID In Downconversion, defines Video Scaling.
GOP	N/A	GOP	Allows to define GOP related parameters
PCR PID	Any PID	Video PID	Input - Any PID may input the PCR PID. Output - Only video PID may transmit the PCR PID

The transcoding parameters are grouped in the **Video Transcoding** tab as explained below. For PCR configuration, see [Configuring a PCR PID](#).

To transcode a Video PID:

1. Log into the device.
2. In the **Logical Output** pane, drill down to the required program.



3. Double-click the program node to view its PIDs.
4. To transcode its video PID, select the PID and from the drop-down menu select **Properties**.
5. Select the **Transcoding** check box to show transcoding-related sections.
6. Continue according to the instructions in the following sections.

Configuring Transcoding Basic Parameters

To configure basic transcoding parameters:

1. Focus on **Transcoding Configuration > Basic**.
2. **Resolution Conversion** - open the list and select one of the following:
 - ❑ SD to SD
 - ❑ HD to HD
 - ❑ HD to SD
 - ❑ Any to PIP. See [Transcoding a PIP Service](#).
3. To select the input stream type, open the **Original Coding Format** list and select the required type: H.264 or MPEG2.
4. To select the output stream type, open the **Coding Format** list and select the required type: H.264 or MPEG2.
5. To define the output resolution, open the **Resolution** list and select one of the following:

Table 5–3: Output Resolution

Output Video Format	Output Resolution
N/A	Follow input
HD	<ul style="list-style-type: none"> ■ 720p - supports 1280x720, 960x720 for both 50 and 60 Hz ■ 1080i - supports 1920x1080, 1440x1080, 1280x1080 for both 50 and 60Hz
SD	<ul style="list-style-type: none"> ■ PAL 50Hz - supports 720/704/640/544/528/480/352 X 576 ■ NTSC 60Hz - supports 720/704/640/544/528/480/352 X480

6. Profile - read only. View one of the following according to the following table:

Table 5–4: Profile Configuration

Format	SD	HD
MPEG2	main	high
H.264	main/high	main/high

Configuring Transcoding Bitrate Parameters

To define the required output bit rate of the stream:

1. Click the **Bitrate** section.

The screenshot shows a web interface for transcoding configuration. The 'Transcoding Configuration' header is at the top. Below it, there are two tabs: 'Basic' and 'Bitrate'. The 'Bitrate' tab is currently selected. Under the 'Bitrate' tab, there are two settings: 'Bitrate Mode' and 'Bitrate (Mbps)'. 'Bitrate Mode' is set to 'CBR' and 'Bitrate (Mbps)' is set to '4'.

2. Open the **Mode** list, select either CBR or VBR and configure as follows:
 - ❑ **CBR Configuration - In Rate (bps)**, enter the required output bit rate. See [Table 5-9](#).
 - ❑ **VBR Configuration -**
 - ❑ Open the **Pool** list and select the required pool. To create a pool, see [Creating a Pool](#). Currently, mixed pools (HD/SD, MPEG2/AVC) are not supported.
 - ❑ In **Min Rate**, enter the minimum rate of the video PID. Total sum of minimum rates of streams in the pool should be smaller than pool rate. See [Table 5-8](#).
 - ❑ In **Max Rate**, enter the maximum rate of the video PID. See [Table 5-8](#).



NOTE: You can configure the bitrate of the transcoded stream at service level. See [3. Under Output PID, in the Stream Conditioning Offset \(ms\) field, set the required offset value by typing a value in the text box or clicking the Up/Down arrows.](#)

Configuring Transcoding Aspect Ratio Parameters

Table 5-5: Aspect Ratios and video format

Video Format	Available Aspect Ratios Option	Explanation
HD to HD	Follow Input	Follow Input
SD to SD	Follow Input 4:3 16:9	Follow Input 4:3 16:9
HD to SD	4:3 16:9	4:3 16:9

To configure the aspect ratio:

1. Click on the **Aspect Ratio** section:
2. Open the **Aspect Ratio** list and select one of the following options according to the video format.

For further information, see [Table 5-5](#).

- ❑ Follow input - No changes to the aspect ratio.
- ❑ 16:9 - (Letter Box) the international standard format of HDTV, non-HD digital television and analog wide screen television.
- ❑ 4:3 - (Center Cut) select for standard TV.

Video Scaling applies to downconversion, HD to SD only.

3. For HD to SD, open the **Video Scaling** list and select one of the following options:
 - ❑ Force letter-box
 - ❑ Force center-cut
 - ❑ Follow AFD (fallback to letter-box) - default value
 - ❑ Follow AFD (fallback to center-cut)
 - ❑ Squeeze to Anamorphic - only in case the aspect Ratio is 16:9

Configuring Transcoding User Data Parameters

Table 5-6: Transcoding User Data Parameters

Closed Caption Option	Explanation
Pass	Passthrough any closed caption data present in the input stream
Discard	Remove any closed caption data present in the input stream
SCTE-20 ATSC A/53 SCTE-20 + ATSC A/53 ATSC A/72 NADBS	Closed caption data outflows in formats including dual-caption SCTE-20 + ATSC A/53. The closed caption data format depends on Video Format and Stream Type.

To manage user data at the output:

- Click the **User Data** section and do the following:

The screenshot shows the 'Transcoding Configuration' window with the 'User Data' tab selected. The settings are as follows:

Setting	Value
Close Caption Conversion:	Pass
AFD:	Re-Insert
Other:	Re-Insert
Border Filter:	Off

- Open the **Closed Caption Conversion** list and select one of the following options:
- AFD** (Active Format Definition) - Open the list and select either of the following:
 - ☐ Re-Insert - To re-insert data related to the aspect ratio of the image.
 - ☐ Discard - To discard data related to the aspect.
- Generate AFD if Input Missing** - Open the list and select one of the following as shown in the following table:

Definition	Integer	Aspect Ratio
SD-> SD	1	4:3 full frame (1000)
	2	4:3 full frame (1001)
	3	16:9 letterbox, vertically centered (1010)
	4	14:9 letterbox, vertically centered (1011)
	5	4:3 full frame, alternative 14:9 center (1101)
	6	16:9 letterbox, alternative 14:9 center (1110)
	7	16:9 letterbox, alternative 4:3 center (1111)

Definition	Integer	Aspect Ratio
HD-> HD	11	16:9 full frame (1000)
	12	4:3 pillarbox (1001)
	13	16:9 full frame (1010)
	14	14:9 pillarbox (1011)
	15	4:3 pillarbox, alternative 14:9 center (1101)
	16	16:9 full frame, alternative 14:9 center (1110)
	17	16:9 full frame, alternative 4:3 center (1111)

5. **Other** - Open the list and select one of the following:
 - ☐ Re-Insert - To re-insert data related to the aspect ratio of the image.
 - ☐ Discard - to discard all user data except AFD and closed caption data.
6. **Border Filter** applies to broadcast transcoding of SD to SD only. To enable, open the **Border Filter** list and select **On**. The transcoding engine removes the following VBI data in the video signal:
 - ☐ If input is 480i (NTSC), AMOL (Automated Measurement of Lineups) data is removed.
 - ☐ If input is 576i (PAL), WSS (Wide Screen Signaling) data is removed

In both cases, the VBI data occupies the first active line of video per video field. The line suppressing functionality will copy the video data from the second line of video (per field) into the first line of video (per field).



NOTE: Border Filter is not supported if Adaptive Passthrough is selected.

Configuring Transcoding GOP Parameters

To configure GOP related parameters:

1. Click the **GOP** section.

Transcoding Configuration

Basic

Bitrate

Aspect Ratio

User Data

GOP

GOP Mode:

Open/Close:

GOP Length (N):

Mini GOP Length (M):

Follow

Open GOP

30

3

2. To select the output GOP structure, open the **GOP Mode** list and select one of the following options for the out:

Mode	Explanation
Follow Input	Default. The GOP mode is as in the input
Fixed GOP	The number of frames for inserting the I frame and for inserting the reference frame (P frame) is fixed.
Variable	The number of frames for inserting the I frame changes. First it is as in the input but may change as required.
Capped	Defines the maximum number of frames for inserting the I frame. The number of frames should never exceed the value defined in N frames .
Fixed M	Defines a fixed number of frames for inserting a reference frame (P frame) no matter when the I frame is inserted.

3. Open the **Open/closed GOP** list and select either of the following:
- ☐ Follow Input GOP - Default option
 - ☐ Closed GOP - Frames from current GOP cannot reference I frames from previous GOP.
 - ☐ Open GOP - Frames from current GOP can reference I frames from a previous GOP.
4. To define the number of frames for inserting a P frame, in **M Frames**, select the required value. The following table lists the valid M frame values:

Output Stream	M Valid Values	M Default Values
MPEG2 (HD/SD)	1,2,3	3
H.264 SD H.264 HD1080i,	1,2,4	4
H.264 HD 720p	1,2,4,8	8

5. To define the maximum number of frames in the outgoing GOP, in **N frames**, enter the maximum number of frames for inserting the I frame in a range of 6-90.



NOTE: N should be a multiple of M.

Configuring Transcoding DPI Parameters

DPI section allows to splice a transcoded VBR video stream following an SCTE35 request. This feature is enabled, only is a DPI PID is provisioned.



NOTE: DPI is disabled for Any to PIP.

To configure DPI related parameters:

1. Click the **DPI** section.
2. Select **Transcode as CBR During Ad.**

Transcode as CBR During Ad allows you to splice a transcoded VBR video stream following an SCTE35 request. Once you enable this feature, configure the CBR bitrate for the stream and a timeout period. This feature is enabled only if a DPI PID is provisioned.

3. **Bitrate (Mbps)** - Appears only if **Transcode as CBR During Ad** is enabled. Select the required CBR for the video stream that applies during the splicing.
4. **Timeout (seconds)** - Appears only if **Transcode as CBR During Ad** is enabled. Select the period of time after which splicing is stopped and the video stream switches back to VBR. This parameter is used in case the avail is not indicated.

OSD Subtitles (On Screen Display)

ProStream 9100 supports DVB Subtitle Burn-in for Broadcast transcoded streams.



NOTE: This feature does not apply to Multiscreen or PIP transcoding.

Table 5-13 shows OSD specifications.

Specification	Explanation
Video format	Any: SD/SD, HD/HD and HD/SD
Transcoded service	Enable the feature independently
Language	Single language per service Single language per PID
Burn-in object	Graphical objects only



NOTE: MPEG-2 to MPEG-2 Adaptive Passthrough cannot be used with DVB Subtitle Burn-in.

To configure OSD Subtitles related parameters:

1. Click the **OSD Subtitles** section.
2. To enable OSD subtitles, select **Enable DVB Subtitles**.
3. Select one of the **Source Selection** options:
 - ☐ By PID - configure Input PID
 - ☐ By Component - configure Input Program Number and Component ID
 - ☐ By Language
4. If By PID is used, select the **Input PID**.
5. If By Component or By Language is used, select the **Input Program Number**.
6. If By Component is used, select the **Component ID**.
7. If By Language is used, select the **Language**.
8. For all source options, set **Sync Compensation (ms)**. The range is from 1500 to 3000 ms.
9. For all source options, set **Page Timeout (sec)** to avoid displaying obsolete subtitles.

Configuring Transcoding Advanced Parameters

To configure Advanced related parameters:

1. Click the **Advanced** section and set the following options.

2. **MCTF** (Motion-Compensated Temporal Filtering) - By default is Off.

MCTF affects the video quality and reduces noises. If the service bit rate is low it is recommended to use strong MCTF. However, strong MCTF affects the sharpness of the picture.

To select the required MCTF, open the **MCTF** list and select the required level.

3. **Adaption Filed Insertion** - You can add data about the stream. You cannot select the content of data, only whether to add data.
4. **PES Insert Rate** - This parameters is required for H264 set-top-boxes and it applies to H264 output streams. Open the **PES Insert Rate** and select either of the following:
 - ☐ Every Picture - The default option. PES packets are inserted per field.
 - ☐ Alternate - PES packets are inserted per frame.

When output resolution is 720p, always use PES per frame.

5. **MP2 Adaptive-PT** - Applies to PEG2-to-MPEG2 SD, HD, 50/60Hz, CBR/VBR input and output.

When you need to enable adaptive passthrough, the device automatically enforces the required configuration. See also [Video Quality Enhancement](#).

To enable adaptive passthrough

- ☐ In **MP2 Adaptive-PT**, select **Enable**.

The **Save Changes** dialog box appears with a list of the configuration changes you defined.

- ☐ Click **OK** to save your changes.

The device automatically applies adaptive passthrough.



NOTE: When disabling MP2 Adaptive-PT, the enforced configuration is maintained, but the parameters are enabled and you need to change their values as required.

6. **Premium Channel** - Applies to SD format only. Select this option to allocate an entire transcoding engine for a single broadcast SD program.
The allocation ensures that the program does not affect and is not affected by any other program if there are input problems.
7. **Frame Rate Auto Detection** - Select this option to allow auto-detection of the frame rate. This option is enabled as follows:
 - ☐ Resolution Conversion is HD to HD or HD to SD.
 - ☐ Resolution Conversion is SD to SD and Premium Channel is enabled.

Transcoding a PIP Service

The following section instructs you on how to transcode a PIP service using the web client of the ProStream 9100 transcoder. The following table lists the required configuration to allow the transcoding of the video PID of a PIP service.

Table 5-7: Required configuration for Transcoding a PIP Service

Parameter	Specification	Explanation
Enabling PIP	Enable PIP	PIP configuration is allowed on the device

Table 5-7: Required configuration for Transcoding a PIP Service

Parameter	Specification	Explanation
Output Codec	H.264	
Output Resolution	96 x 96 92 x 192 128 x 96 192 x 192 192 x 144	
Video Bitrate	100 to 550 Kbps CBR only	
Frame Rate	50/60Hz	

These operations are service affecting for both the main and PIP coupled services:

- Adding/Removing PIP from the main Service
- Recovery from any error condition in main/PIP might result in service interruption to main/PIP.



NOTE: You cannot delete, disable and untranscode-transcode a main service when a PIP service is coupled with it.

The transcoding parameters are grouped in the **Transcoding** tab as explained below. For PCR configuration, see [Configuring a PCR PID](#).

To enable and transcode PIP services:

1. Go to **Administration > Video Procession**.
2. Select **ACE Picture in Picture (PIP)**.
3. Click **Apply**.
4. In the **Logical Output** pane, drill down to the required program.
5. Double-click the program node to view its PIDs.
6. To transcode its video PID, select the PID and from the drop down menu select **Properties**.

The following dialog box appears.

7. To select the video format, open the **Resolution Conversion** drop-down list and select **Any to PIP**.
8. To define the output resolution, open the **Output Resolution** list and select one of the following:
 - ☐ 96 × 96
 - ☐ 92 × 192
 - ☐ 128 × 96
 - ☐ 192 × 144
 - ☐ 192 × 192
9. To define the profile, open the **Main** list and select either **Main** or **Baseline**.
10. To define the main service focus on the PIP section, open the **Main Service** list and select services that might be coupled with PIP services.



NOTE: Main and PIP services have the same input. Any input problem triggers an alarm on the main service.

11. Click the **Bitrate** section and in **Rate**, enter the required output bitrate in bps of the video PID.

See [Table 5-9](#).

Defining Output Bitrate of a Transcoded Service

If the output service is a VBR service in a pool, configure it according to the following table:

Table 5-8: Bitrate of a VBR Output Service

VBR Output Service Type	Min Rate (Mbps)	Max Rate (Mbps)
SD MPEG2	0.5	8
HD MPEG2	2	18
SD H.264	0.5	8
HD H.264	1	18

If the output service is a CBR service, configure it according to the following table:

Table 5-9: Bitrate of a CBR Output Service

CBR Output Service Type	Min Rate (Mbps)	Max Rate (Mbps)
SD MPEG2	2	8
HD MPEG2	6	20
SD H.264	1	8
HD H.264	3	18
HD/SD PIP	0.1	0.55

PCR and Video Transcoding

- The PCR PID outflows over the video PID. To configure it, see [Configuring a PCR PID](#).
- Reference PCR value is indicated for all PIDs of the service. Reference PCR indicates the PCR PID in the input. If, the input PCR PID changes, you need to manually change the Reference PCR PID for every PID of the transcoded service. Select the **PID > PID Properties** page.

PID 4131 (0x1023) of Program 16 (Srv_T16) on TS ID 116: ES Properties

Output PID: 4131 (0x1023)

ES Type: 2 (0x2) MPEG-2 Video

Transcoding: ☒

Source

Remux Mode: PID

Input TS: #4 (TS ID: 1)

Input PID: 4131 (0x1023)

Reference PCR Input PID: 4131 (0x1023)

Transcoding Configuration

Basic

Resolution Conversion: SD to SD

Original Coding Format: 2 (0x02) MPEG-2

Coding Format: 2 (0x02) MPEG-2

Resolution: Follow the input

Profile: Main

Bitrate

Aspect Ratio

User Data

GOP

DPI

OSD Subtitles

Advanced

Advanced Options

Redundancy Triggers

PCR

Advanced

OK Cancel Save

- When transcoding a service, PCR Generation Mode is not selected in **Service > PCR** table, **Generation Mode**:

Program 1 (Srv_T1) of TS ID 101: Properties

Program Name: Srv_T1

Program Number: 1

Priority: High

PMT PID: 256 (0x100)

Service CBR: ☐

Bitrate: 3

Advanced Options

Scrambling

Redundancy

PCR

Generate PCR: ☐

Insert PCR On: 512 (0x200)

Slate

EAS

Splicing DPI

ESAM

Other

OK Cancel Save

Transcoding Conventions

Table 5–10: Transcoding Conventions

Icon	Explanation
	Transcoded Video PID
	Transcoded Audio PID
	Pool

For transcoding conventions, see [Stream Configuration Page Conventions](#).

Creating a Pool

To create a pool:

1. Log into the device.
See [Logging into the Device](#).
2. Select **DiviTrack > DTMX**.
3. In **Pools**, click **Add Pool**.
4. Configure the name of the pool and its bitrate.

The default pool rate is 20bps. Enter the required pool rate in bps.



NOTE: The bitrate of the pool should consider the transport bitrate and allow enough bitrate for additional PIDs that are included in the TS.

5. In **Pool Configuration**, select the required pool.
6. To associate a pool with a PID, click **Add**.
7. Click **OK**.

The PID is added to the pool.

8. View the following information:
 - ❑ Pool Bitrate - the configured bitrate of the pool.
 - ❑ A table that lists and shows the following parameters of pool streams:

Parameter	Explanation
#	Sequential number of the stream
Video ES	The PID, its program, and its output TS number
Resolution Conversion	Input - HD/SD Output - HD/SD
Transcoding	Transcoding Type: <ul style="list-style-type: none"> ■ H-M - input H.264 to MPEG2 output ■ M-M - input MPEG2 to MPEG2 output ■ H-H - input H.264 to H.264 output
Min. Bitrate	The minimum rate of the stream
Max. Bitrate	The maximum rate of the stream
Nominal Bitrate (Mbps)	The required bitrate

Removing a Pool

To remove a pool:

1. Log into the device as explained in [Logging into the Device](#).
2. Select **DiviTrack > DTMX**.
3. In **Pool**, select the required pool and click **Remove**.

Video Quality Enhancement

To improve the Video Quality (VQ), ProStream 9100 supports Adaptive Passthrough processing. This type of processing adaptively selects between the following modes, to get better VQ:

- Full rate shaping.
- Full passthrough - Where input is passed as is without transcoding. When the output stream bitrate is higher than the input stream bitrate, the device will mostly operate in full passthrough (very low input, VBV, may disable passthrough for a short period).
- Partial passthrough - Where B-frames only are rate shaped. Partial passthrough tends to kick in when the output bitrate is slightly lower than input bitrate (i.e., small rate reduction ratios).



NOTE: Adaptive passthrough processing triggers when applicable; you cannot configure it.

Adaptive passthrough applies to the following:

- Video format - SD, HD
- Stream type - MPEG2-to-MPEG2
- Horizontal resolution - 50/60Hz
- Bitrate - CBR/VBR input and output

When adaptive passthrough is enabled, the following configuration is enforced:

- All applicable user configurations (Output Resolution, Aspect Ratio, GOP Mode, Open/Close GOP) are set to *Follow input*
- User Data
 - Closed Caption is set to *Pass*
 - Discard AFD is grayed out
 - Discard Other is grayed out
- AF Data is set to *No*
- MCTF is set to *Off* or *Very Weak*
- Set-top box mode is set to *DVB*.



NOTE: When input bitrate is high, the adaptive passthrough feature might be disabled.

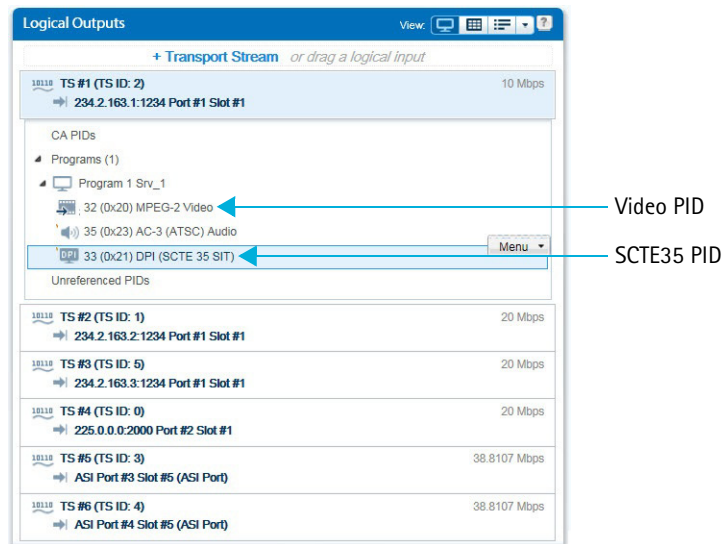
Stream Conditioning for DPI

ProStream with ACE 5.2 and above supports GOP manipulation and VBV management, also known as stream conditioning. Stream conditioning is applied automatically to optimize the splice in/out points for downstream splicing. Stream conditioning is based on SCTE35 triggers.

ProStream allows you to align preroll messages at the precise point of splicing by adding a positive or negative offset in milliseconds at the stream conditioning location. The offset value is applied to the PTS value, which is taken from the SCTE35 message.

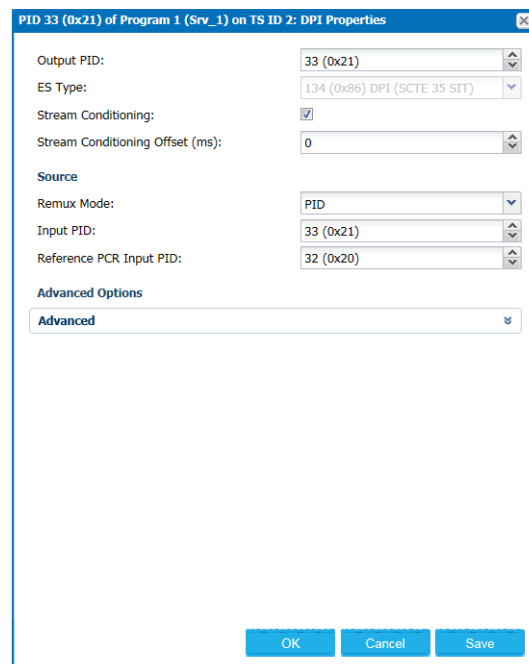
To configure stream conditioning:

1. In **Configuration**, in the Logical Outputs section, drill down to the service with the transcoded video stream to which you want to apply stream conditioning.



2. Double-click the SCTE35 PID.

The PID <#> DPI Properties dialog box appears.



3. Under Output PID, in the **Stream Conditioning Offset (ms)** field, set the required offset value by typing a value in the text box or clicking the Up/Down arrows.

The offset value range is -3000 to +5000.

The default offset value is 0.

4. Click **OK**.

Configuring Bitrate of Transcoded Stream at Service Level

ProStream with ACE 5.2 controls the output bitrate at the service level. The transcoded video bitrate is controlled to maintain an overall constant bitrate for the whole service while maintaining video quality. When audio or data PIDs are not transferred, the bitrate is utilized for the video stream. The video bitrate is maximized to the overall bitrate of the service.



NOTE: To allow CBR with service bitrate control, the video stream should be transcoded.

To configure a transcoded stream at the service level:

1. In the Logical Output section, select the required program.
Its video PID should be transcoded.
2. From the program drop-down menu, select **Properties**.

Program 1 (Srv_1) of TS ID 5: Properties

Program Name: Srv_1

Program Number: 1

Priority: High

PMT PID: 32 (0x20)

Service CBR: ☐

Bitrate: 0

Advanced Options

- Scrambling
- Redundancy
- PCR
- Slate
- EAS
- Splicing DPI
- ESAM
- Other

OK Cancel Save

3. To enable the feature, select **Service CBR**.

The **Bitrate** box is enabled.

4. In **Bitrate**, enter the required service bitrate.

This bitrate is maintained as the overall constant bitrate for the whole service while ensuring video quality. In the PID Properties dialog, in Service Bitrate, the bitrate is read only.

Alarm Related to Bitrate Control at Service Level

- If the bitrate allocated for the video stream is too low, the *Service CBR Bitrate Too Low* alarm is raised by the service.
- If the overall bitrate of non-video streams exceeds the configured service bitrate, the *Service CBR Overflow* alarm is raised by the service.

Logo Insertion

The Logo Insertion feature places a small user-provided logo image over the input video. The image is static (non-animated) and it can have transparent and translucent regions.

To insert a logo:

1. From the **Logo Name** box, select the required .png file.
To upload a.png file for a logo, see [Uploading Logo Insertion Files](#).
2. Focus on **Transcoding Configuration > Logo Insertion**.
3. Select the **Enable Logo Insertion** check box to insert the logo.
4. Use **Vertical Offset** and **Horizontal Offset** to offset the position by a number of pixels from a reference point.

Reference positions are top left corner, top right corner, bottom left corner and bottom right corner.

Transparency is adjusted on a scale from 0-100, with 0 = opaque, and 100 = invisible.

Audio Transcoding

This version of ProStream 9100 enables the transcoding of audio PIDs as well as video PIDs. The density varies according to the input/output stream type and input/output codecs. See [Audio Transcoding Options and Density](#).

Audio Transcoding Glossary

Table 5–11: Audio Transcoding Glossary

Term	Explanation
AC3	Dolby
E-AC3	Enhanced Dolby
AAC	Advanced Audio Coding
ALA	Audio Level Adjustment
HE-AAC	High-Efficiency Advanced Audio Coding
HE-AAC v1	High-Efficiency Advanced Audio Coding version 1
HE-AAC v2	High-Efficiency Advanced Audio Coding version 2
MC	Multichannel (5.0/5.1)
MP1L2	MPEG1 Layer II
ST	Stereo (2/0), Joint Stereo, Mono (left or right channel), Dual Mono
LFE	Low Frequency Effects channel

Audio Transcoding Options and Density

The device transcodes audio PIDs as listed in table [Table 5–12](#).



NOTE: All options that are marked with a “V” are fully tested. Other options are not tested, but are available for configuration.

Table 5–12: Audio Transcoding Options

Output <	
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The following table lists the possible combinations of audio transcoding per transcoding card.

In [Table 5–13](#), the numbers do not include ALA processing.

In [Table 5–14](#), the numbers include ALA processing.

To define audio transcoding combinations, also use table [Table 5–15](#).

Table 5–13: Audio Transcoding Density without ALA

Output 	
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The following table lists the required processing units per input/output transcoding option. Use this table for defining maximum capacity, per card, of any stream combination.

Table 5–14: Audio Transcoding with ALA

Output 	
--	--



NOTE: A single card has total of 3750 processing units.

ALA requires more processing units:

- ALA ST (2.0) requires additional 61 processing units
- ALA MC (5.0/5.1) requires additional 104 processing units

For example:

MP1L2 to MP1L2 (Stereo) without ALA: requires 63 processing units

MP1L2 to MP1L2 (Stereo) with ALA: 63+61 = 123 processing units

Table 5–15: Audio Transcoding Required Processing Units

Output 	
--	--

Audio Transcoding Bitrate

The following table lists the audio ES bitrate in Kbps. The allowed bitrate values are according to input/output stream type - MP1L2/AAC/AC3 and Coding Mode - single/stereo/multi channel.

Bitrate default values:

- 192kbps - for Single/Stereo channel
- 384kbps - for Multi channel Dolby® Supported Parameters

Table 5–16: Audio Transcoding – Output Bitrate

Output Audio Codec	ES Bitrate (Kbps)
MP1L2 stereo (2.0)	32 - 384
AAC stereo (2.0)	32 - 384
AAC multi-channel (5.1)	224 - 640
HE AACv1 stereo (2.0)	32 - 128
HE AAC v1 multi-channel (5.1)	96 - 192
HE AAC V2 stereo (2.0)	32 -64
Dolby Digital (AC-3) stereo (2.0)	96 - 640
Dolby Digital (AC-3) multi-channel (5.1)	32 - 640
E-Dolby Digital (E-AC3) stereo/multi-channel	32-1024

Table 5–17: Dolby Supported Parameters

Topic	Parameter
Bitstream Information (BSI)	Bit Stream Mode
	Dialog Normalization
	Production Information (mix level and room type)
BSI Extension	Stereo Downmix Preference
	Mix Levels
	Surround EX Mode
	Head Phone Mode
	A/D Converter Type
	Alternate BSI Syntax
E-AC3 additional configuration	Source Sample Rate
	Stream Type
	Sub Stream ID
Processing	DC High Pass Filter
	Bandwidth Low Pass Filter
	Digital De-emphasize
	Dynamic Range Compression

Table 5–17: Dolby Supported Parameters

Topic	Parameter
Multichannel Processing	LFE Low Pass Filter
	90 Degree Phase Shift
	3 dB Attenuation

Audio Transcoding Procedure

To transcode an audio PID:

1. Log into the device.
2. In the **Logical Output** section, select the required program.
3. Right-click the required audio PID and select **Properties**.

PID 337 (0x151) of Program 1 (Srv_1) on TS #2: ES Properties

Output PID: 337 (0x151)

ES Type: 2 (0x2) MPEG-2 Video

Transcoding: ☐

Source

Remux Mode: PID

Input TS: TS-0 (TS ID: 2, TS-0)

Input PID: 337 (0x151)

Reference PCR Input PID: 337 (0x151)

Redundancy Triggers

PCR

Advanced Options

Advanced

OK Cancel Save

4. In **Output PID**, select the required output PID.
5. In **ES Type**, select the required type of the output audio PID.
6. To enable transcoding, select **Transcoding**.

To configure the transcoding related parameters, focus on the Transcoding Configuration section.

Configuring Basic Transcoding

To configure basic transcoding:

1. Focus on the **Transcoding Configuration > Basic** section.

The screenshot shows the 'Transcoding Configuration' window with the 'Basic' tab selected. The settings are as follows:

Parameter	Value
Input ES Type:	4 (0x4) MPEG-2 (Musicam) Audio
Original Coding Format:	Any
ES Type:	15 (0xF) AAC ADTS
Input Coding Mode:	Any
Coding Mode:	Follow the input
Sample Rate (kHz):	48 kHz
ES Bitrate (Kbps):	192
Affective Bitrate (Kbps):	199.75

Below the Basic section, there are three expandable sections: AAC, Audio Level Adjustment, and Advanced.

2. To select the input stream type, open the **Input ES Type** list and select one of the following:
 - ☐ 3 (0x3) MPEG-1 Audio
 - ☐ 4 (0x4) MPEG-2 (Musicam) Audio
 - ☐ 6 (0x6) E-AC-3 (DVB) Audio
 - ☐ 6 (0x6) AC-3 (DVB) Audio
 - ☐ 15 (0xF) ACC ADTS
 - ☐ 17 (0x11) ACC LATM
 - ☐ 129 (0x81) AC-3 (ATSC) Audio
 - ☐ 135 (0x87) E-AC-3 (ATSC) Audio
3. Original Coding Format - Options depend on the selected input stream type as seen in the following table.

Table 5–18: Input Coding Format Options according to Input Stream

Input Stream Type	Decoding Format Options
MPEG1 Layer II	Any decoding format. Not configurable
AC-3 ATSC	
E-AC-3 ATSC	
AC-3/E-AC-3 DVB	Any
	AC-3 (default)
	E-AC-3
AAC	Any input decoding format
	AAC LC
	ACC HE

If the coding format of the input stream is unknown, select **Any**. If a low MHz decoder (AAC LC / AC3) is selected and the actual decoding format is a high MHz decoder (AAC HE / E-AC3), an alarm is raised.

4. **ES Type** - Read only. Indicates the output stream type. To select the Output stream type, focus on **ES Type** list at the top of the dialog.
5. **Original Coding Mode** - Enables transcoding resources allocation. If the coding of the input stream is unknown, whether ST - less resources, or MC - more resources, select **Any**. If ST is selected and the input coding is MC, an alarm is raised.

To select the input coding mode, open the **Input Coding Mode** list and select the required coding mode. Coding mode options depend on the selected input stream type as the following table lists:

Input Stream Type	Input Coding Options
(0x3) MPEG-1 Audio	Any input coding. Not configurable
AC-3/E-AC-3 all flavors ACC	Any
	Stereo/Mono
	Multichannel

6. Open the **Output Coding Mode** list and select the required coding mode. Coding mode options depend on the selected output stream type as the following table lists:

Output Coding Options	MPEG1L2	AAC	HE AAC V1	HE AAC V2	AC3/E-AC3
Follow input	V	V	V		V
Stereo (2/0)	V	V	V	V	V
Single channel left (1/0)	V	V	V		V
Single channel right (1/0)	V	V	V		V
Dual Mono (1+)	V	V	V		V
Joint Stereo (2/0)	V				
Multi Channel (3/2)		V	V		V
Multi Channel (3/2 LFE)		V	V		V



NOTE: Any changes to input/output Codec, input/output Coding Mode and output AAC is service affecting.

Sampling rate is 48 kHz and it is not converted.

7. Open the **ES Bitrate** list and select the required output ES bitrate.

The bitrate list is updated according to the output stream type and the selected output codec.

TS Bitrate is updated to display the total TS bitrate. View TS bitrate in **TS Bitrate** box.

8. **Affective Bitrate (Kbps)** - Read only. View the current ES bitrate.

Advanced Transcoding Configuration

To configure advanced transcoding operations:

1. Focus on **Transcoding Configuration > Advanced**.

The screenshot shows the 'Transcoding Configuration' window with the 'Advanced' tab selected. The settings are as follows:

Transcoding Configuration	
Basic	⌵
AC-3/E-AC-3	⌵
Audio Level Adjustment	⌵
Advanced	⌶
Copyright:	Follow Input ⌵
Frames per PES:	6 ⌵
Static Level Adjustment (dB):	0 ⌵
Delay Adjustment (ms):	0 ⌵
Force Decoder as Dual Mono:	<input checked="" type="checkbox"/>

2. To select the required copyright mode, open the **Copyright** list and select one of the following:
 - ❑ Copyright - Original: Indicates that the audio stream is copyright protected by the original copyright bitstream
 - ❑ Copyright - Copy: Indicates that the audio stream is copyright protected by a copy of the copyright bitstream
 - ❑ Not Copyright: Original: Original audio stream is not copyright protected
 - ❑ Not Copyright: Copy: Copy of the audio stream is not copyright protected
 - ❑ Follow Input
3. **Frames per PES** - To control the number of Audio frames that are packed in a single PES (Packetized Elementary Stream), open the **Frames per PES** list and select the required number between one to six. Six is the default.
4. **Static Level Adjustment** - If ALA is not used, configure a fixed gain adjustment for the output audio stream.
 It increases/decreases the audio volume by a fixed dB value. The valid range is (-20) to 0 dB and the default value is 0. See [Configuring Audio Level Adjustment](#).
5. **Delay Adjustment (msec)** - To adjust audio delay (PTS) to compensate for input with A/V synchronization problems, enter the required value, between (-500) to 500ms. The default value is 0.
6. **Force Decoder as Dual Mono** - Select this check box to output one channel of a stereo pair instead of down-mixing both channels into a single channel.

Configuration Following the Output Stream Type

Transcoding Configuration section is updated according to the output stream type and it allows configuration specific to this stream type.

Specific MPEG-1L2 Configuration

The instructions below assume that the output stream type is **3 (0x3) MPEG-1 Audio**, or **4 (0x4) MPEG-2 (Musicam) Audio**.

To configure a specific MPEG-1 or MPEG-2 output stream:

1. Focus on **Transcoding Configuration > MPEG-Layer II**.

The **MPEG-1 Layer II** menu appears.

PID 1604 (0x644) of Program 100 (Srv_100) on TS ID 4: ES Properties

Output PID: 1604 (0x644)

ES Type: 3 (0x3) MPEG-1 Audio

Transcoding: ☒

Source

Remux Mode: PID

Input TS: #8 (TS ID: 2291)

Input PID: 1604 (0x644)

Reference PCR Input PID: 1602 (0x642)

Transcoding Configuration

Basic

Input ES Type: 4 (0x4) MPEG-2 (Musicam) Audio

Original Coding Format: Any

ES Type: 3 (0x3) MPEG-1 Audio

Input Coding Mode: Any

Coding Mode: Stereo

Sample Rate (kHz): 48 kHz

ES Bitrate (Kbps): 192

Affective Bitrate (Kbps): 198,444

MPEG-1 Layer II

Error Protection: ☐

Audio Level Adjustment

Advanced

Advanced Options

Redundancy Triggers

PCR

OK Cancel Save

2. Select the **Error Protection** box.

Specific AAC Configuration

AAC and HE AAC can be encapsulated in the output transport stream in either of the following methods:

- ADTS (Audio Data Transport Stream) is the encapsulation method used if you select MPEG-2 HE AAC as the coding mode extension. ADTS is assigned a stream type value of 0x0F.
- LATM (Low-overhead Audio Transport Multiplex) is the default encapsulation method used if you select MPEG-4 HE AAC as the coding mode extension. LATM is assigned a stream type value of 0x11.

To define a specific AAC configuration:

The instructions below assume that the output stream type is **AAC** or **HE AAC**.

1. Focus on **Transcoding Configuration > ACC. T**.

2. To select a coding extension, open the **Coding Mode** list and select one of the following:
 - ☐ MPEG-4 AAC
 - ☐ MPEG-4 HE AAC
 - ☐ MPEG-4 HE AAC v2
 - ☐ MPEG-2 AAC
 - ☐ MPEG-2 HE AAC
 - ☐ MPEG-2 HE AAC v2
3. To enable error protection, select **Error Protection**.
4. To enable Temporal Noise Shaping (TNS), select **TNS**.
5. To enable Perceptual Noise Substitution (PNS), select **PNS**. When **Coding Mode** is **MPEG-2**, PNS is selected not configurable. When **Coding Mode** is **MPEG-4**, PNS is selected and is configurable.

Specific Dolby® AC-3™/E-AC-3 Configuration

The following instructions assume that the output stream type is AC-3 all flavors.

To configure AC-3/E-AC-3:

1. Focus on **Transcoding Configuration > AC-3**. Click the **AC-3/E-AC-3** menu.
 The bitstream mode describes the audio service contained within the Dolby Digital bitstream. The stream can carry a main audio service or an associated service. The default bit stream mode is Complete Main.
2. Open the **Bit Stream Mode** list and select one of the following modes:
 - ☐ Follow input.
 - ☐ Main audio: Complete Main - A complete audio service that includes dialog, music, and effects. You can supplement a complete audio service with visually impaired, hearing impaired, commentary, emergency, and karaoke/voice-over associated services.
 - ☐ Main Audio: Music and Effects - An associated service with music and effects but no dialog for the program. You can add the dialog by providing a dialog-associated service.
 - ☐ Associated: Visually Impaired - An associated service with a narrative description of the program's visual content. Audio service for the visually impaired allows the viewer to enjoy the audio aspects with a commentary of the visual aspects of the program.
 - ☐ Associated: Hearing Impaired - An associated service with a single channel of dialog but no music or effects. For the hearing-impaired viewer, the dialog is easier to understand without the combination of music and sound effects in the audio stream.
 - ☐ Associated: Dialogue - An associated service with multiple channels for several different languages.
 - ☐ Associated: Commentary - An associated service similar to the dialog-associated service that provides optional program commentary, not the primary dialog for the program. Used for added commentary during sporting events or educational programming.
 - ☐ Associated: Emergency - An associated service with audio tones that accompany emergency announcements. The tones replace the main audio of a program.
 - ☐ Main/Associated: Karaoke/Voice-Over - An associated service similar to the emergency-associated service, but karaoke audio tones do not replace the main audio of a program.
3. **Dialog Level (dialnorm)** - To select the required value, open **Dialog Level (dialnorm)** and select either of the following values:

- ☐ Follow Input.
- ☐ A value between -1 to -31(dBFS).

This option is the single most important Dolby Digital metadata parameter. Its setting represents the average loudness of dialog in a presentation, and is defined in terms of decibels below 0 dBFS.

When received at the consumer's Dolby Digital decoder, this parameter setting determines the level shift in the decoder that sets, or normalizes, the average audio output of the decoder to a preset level. This aids in matching audio volume between program sources. A dialnorm value of -31 results in no level shift, a value of -1 results in maximum level shift.

The proper setting of the dialog level parameter enables the Dynamic Range Control profiles chosen by the content producer to work as intended in less-than-optimal listening environments.

4. **Dolby Surround Mode** - indicates whether the two-channel Dolby Digital (AC-3) stream contains a Dolby Surround (Lt/Rt) program that requires Dolby Pro Logic^R decoding. Open the **Dolby Surround Mode** list and select one of the following modes:
 - ☐ Follow input
 - ☐ No indication
 - ☐ Not Encoded in Dolby Surround - The bitstream contains information not encoded in Dolby Surround.
 - ☐ Encoded in Dolby Surround - The bitstream contains information encoded in Dolby Surround.
5. **Center Downmix Level** - Applies to Encoding Format AC-3 only. It indicates the level shift applied to the C channel when adding to the L and R outputs as a result of downmixing to an Lt/Rt output. Open the **Center Downmix Level (dB)** list and select one of the following:
 - ☐ Follow Input
 - ☐ -3
 - ☐ -4.5
 - ☐ -6

Surround Mix Level (dB) - Applies to Encoding Format AC-3 only. It indicates the level shift applied to the surround channels when downmixing to an Lt/Rt output.

6. Open the **Surround Downmix Level (dB)** list and select one of the following:
 - ☐ Follow Input
 - ☐ -3
 - ☐ -6
 - ☐ ∞
7. To further configure the AC-3/E-AC-3 output stream, focus on the required menu and define parameters as explained in the following sections:
 - ☐ Multichannel, see [AC-3 All Flavors Multichannel Menu](#).
 - ☐ BSI Extension, see [AC-3 All Flavors BSI Extension Menu](#).
 - ☐ Advanced see [AC-3 All Flavors Advanced Menu](#).

AC-3 All Flavors Multichannel Menu

This menu is available for Dolby AC-3 audio streams when Multichannel coding mode is selected.

To configure items in this menu:

1. Focus on the **Multichannel** menu.



NOTE: Output Coding Mode should be Follow Input or Multichannel.3/2 and 3/2+LFE

2. LFE LowPass Filter - Must be provided only if the LFE channel is enabled. Select the **LFE LowPass Filter** box to turn on low-pass filter for low-frequency effects.
3. The following fields allow you to enable processing options for the surround audio channel:
 - ☐ **Surround Phase Shift** - Select to modulate the phase of the reference signal by 90 degrees.
 - ☐ **Surround 3 dB attenuation** - Select to enable 3 dB attenuation of the surround audio.

AC-3 All Flavors BSI Extension Menu

Bitstream extended information is additional information to be carried about the audio program along with more choices for stereo downmixing. When the metadata parameters carried in Dolby Digital were first described, they were generically called bitstream information, or BSI. The additional parameter definitions are called extended BSI.

To configure the BSI Extension menu:

1. Focus on the **BSI Extension** menu.



NOTE: Output Coding Mode should be Follow Input or Multichannel.3/2 and 3/2+LFE

Extended Bitstream Information (BSI)

Extended BSI:	<input checked="" type="checkbox"/>
Preferred Stereo Downmix:	Lo/Ro
A/D Converter Type:	Standart
Dolby Surround EX Mode:	Dolby Surround
Lo/Ro C Downmix Level (dB):	0.707 (-3 dB)
Lo/Ro S Downmix Level (dB):	0.707 (-3 dB)
Lt/Rt C Downmix Level (dB):	0.707 (-3 dB)
Lt/Rt S Downmix Level (dB):	0.707 (-3 dB)
Headphone Mode:	Encoded in Dplby Headphone

2. **Extended BSI** - Select to enable the following BSI extension parameters.
3. **Stereo Downmix Preference** - Indicates whether the preferred stereo downmix is one of the following:
 - ☐ Not Indicated
 - ☐ Lt/Rt Downmix Preferred - Left total/right total
 - ☐ Lo/Ro Downmix Preferred - Stereo left only/stereo right only
4. **A/D Converter Type** - Select the type of analog-to-digital converter: Standard or HDCD Encoded.
5. **Surround EX Mode** - Indicates whether the audio is encoded for Dolby® Digital Surround EX™. Select one of the following:
 - ☐ Not Indicated
 - ☐ Not Encoded in Dolby Surround EX
 - ☐ Encoded in Dolby Surround EX

6. **Lo/Ro Center Mix Level** - Select the center mix level for left only/stereo right only downmixing.
7. **Lo/Ro Surround Mix Level** - Select the surround mix level for left only/stereo right only downmixing.
8. **Lt/Rt Center Mix Level** - Select the center mix level for left total/right total downmixing.
9. **Lt/Rt Surround Mix Level** - Select the surround mix level for left total/right total downmixing.
10. **Head Phone Mode** - Select one of the following:
 - ☐ Not Indicated
 - ☐ Not Encoded in Dolby Headphone
 - ☐ Encoded in Dolby Headphone

AC-3 All Flavors Advanced Menu

To configure items in the Advanced menu:

1. Focus on the **Advanced** section:

The screenshot shows the 'Advanced' section of a configuration menu. It contains the following items:

- Mixing Level (dB SPL):** A dropdown menu with '105' selected.
- Room Type:** A dropdown menu with 'Small Room' selected.
- DC Filter:** A checkbox that is currently unchecked.
- Lowpass Filter:** A checkbox that is currently unchecked.
- Digital De-Emphasis:** A dropdown menu with 'Disable' selected.
- DRC Profile:** A dropdown menu with 'Film Light' selected.

Mixing Level (dB SPL) - Describes the peak sound pressure level (SPL) used during the final mixing session at the studio or on the dubbing stage.

2. Open the **Mixing Level (dB SPL)** list and select one of the following:
 - ☐ Follow input
 - ☐ A value between 80 to 111dB, in 1 dB increments

Room Type - Describes the equalization used during the final mixing session at the studio or on the dubbing stage. A large room is a dubbing stage with the industry standard X-curve equalization; a small room has flat equalization. This parameter allows an amplifier to be set to the same equalization as heard in the final mixing environment.

3. Open the **Room Type** list and select one of the following:
 - ☐ Follow Input
 - ☐ Not indicated - The room type is not identified in the stream
 - ☐ Large room, X curve monitor - Film-style dubbing stage, x-curve monitoring
 - ☐ Small room, flat monitor - Typical recording studio, flat monitoring

DC Filter - By default this filter is enabled. If selected, activates a 3-Hz direct current (DC) filter for all input channels. The DC filter removes any inaudible low frequency signals and also any DC bias in the input signal.

4. **LowPass Filter** - Select to enable this filter.

Selecting this option activates a bandwidth low pass filter with a cut-off close to the audio bit rate you specified.

5. **Digital De-emphasize** - Specifies whether de-emphasis is on or off.

In some cases, an audio signal might be scaled with a 50/15 microsecond pre-emphasis prior to its transmission.

Configuring the Dynamic Range Compression (DRC)

Different home listening environments present a wide range of requirements regarding dynamic range. Rather than simply compressing the audio program to work well in the poorest listening environments, Dolby Digital encoders can calculate Dynamic Range Control (DRC) information and send it via the Line Mode and RF Mode metadata parameters to the consumer decoder. This metadata can then be applied to the audio signal by the decoder to reduce its dynamic range.

Through the proper setting of DRC profiles during content creation, the producer can provide the best possible presentation of program content in virtually any listening environment, regardless of the quality of the equipment, number of channels, or ambient noise level in the consumer's home.

Six preset DRC profiles are available to content producers: Film Light, Film Standard, Music Light, Music Standard, Speech, and None. Each is applied with the values shown below.

To configure the required Dynamic Range Compression:

- Open the DRC list and select the profile that represents the acceptable range for the program type:
 - None
 - Film Standard and Film Light - In most movies, the dialog is the softest audible part of the sound track. Anything softer in volume than the dialog may not be heard in a typical movie theatre. Therefore, movie sound tracks require only a small amount of volume boost for low levels. Too much boost of low-level audio may reveal unintended sounds in the audio sound track, such as camera reels and background traffic noise that were recorded during production. Dolby recommends setting Film Standard for most program material.
 - Music Standard and Music Light - The acceptable volume range is determined by the music type. Most music has a limited variation in volume range, but you must set an acceptable level so the sound is not too far above other programming.
 - Speech - Most speech sources have limited dynamic range of audio fluctuation. However, some speech sources can have moments that are abnormally loud or soft. The Speech profile uses a 10 dB acceptable range for average speech. If the speech source contains a heavy amount of background noise, use Film Standard or Film Light so the background noise is not audible during gaps in the speech content.

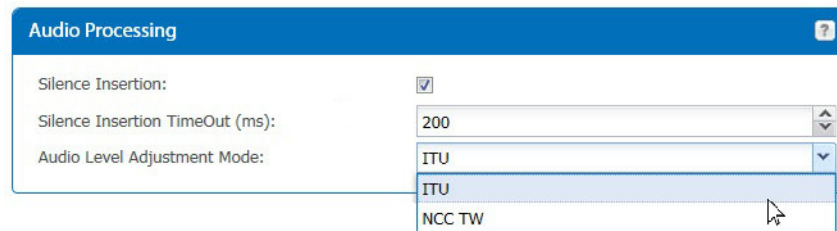
Configuring Audio Level Adjustment

There are two modes of audio levels:

- ITU: The International Telecommunication Union that regulates international use of the telecommunication infrastructure.
- NCC: National Communications Commission that regulates the development of telecommunications in Taiwan.

To select the audio level mode:

1. Click **Administration > Global Settings**.
The Global Settings page appears.
2. In the Audio Processing section, select the required audio level mode from the **Audio Level Adjustment Mode** dropdown list.



You can now adjust the audio level according to the mode you select.

See [Adjusting ITU Audio Levels](#) and [Adjusting NCC Audio Levels](#).

Adjusting ITU Audio Levels

To adjust ITU levels:

1. In the **Logical Output** section, select the required program.
2. Right-click the required audio PID and select **Properties**.
3. In the PID # ES Properties dialog box, make sure that the **Transcoding** check box is selected.
4. Click the **Audio Level Adjustment** section.

Audio Level Adjustment expands to display additional parameters.

5. Select the **Audio Level Adjustment** check box.

Selecting this check box enables ALA according to Level Magic LM™, an adaptive level control that adjusts audio levels from any source at any time to a given reference level.

Enable this option when incoming source levels vary widely between channels (for example, if Service A seems much louder than Service B, or when transient audio level changes within the same channel during commercial breaks, explosions or loud music vs. dialog).

LFE Mode and **Input Gain** become available.

- ❑ **LFE Mode** - Use for multichannel (5.1) streams. Select one of the following two options for LFE control from the drop-down list:
 - ❑ **Unlinked Derived** - Default. LFE follows the Input Gain (dB) configuration of 3/2.
 - ❑ **Unlinked Adjustable** - LFE might have a different Input Gain (dB) configuration than 3/2. Selecting this option also displays the Input Gain (dB) box for LFE.
 - ❑ **Input Gain (dB)** - Allows you to configure the input signal level towards the target loudness level that streams into the ALA module. You can configure this parameter and prevent distortion of the input loudness level before the audio is processed in the ALA module. Enter the required value between -20 to +20dB in steps of 0.1dB. The default value is 0.
6. Configure the following parameters:
 - ❑ Automatic Gain Control - See [ITU Automatic Gain Control \(AGC\)](#).
 - ❑ Transient Processor - See [Transient Processor](#).
 - ❑ Limiter - See [Limiter](#).

ITU Automatic Gain Control (AGC)

Use the AGC to adjust the output level by performing slow gain changes.

To define gain control parameters:

1. In the **Automatic Gain Control** section, configure the following parameters:



TIP: Loudness Target (LKFS) is the main parameter when configuring the ALA processing module.

- ❑ Loudness Target (LKFS) - Allows you to configure the desired output loudness level in LKFS (Loudness, K-weighted, relative to Full Scale). A unit of LKFS is equivalent to a decibel. The range is from -40 to 0. The default level is -24.
- ❑ Time - The amount of time the ALA module takes to scale incoming audio with loudness levels not at target. The time range is from 1 second to 9000 seconds.
- ❑ Max Gain - Limits the maximum amplification allowed by the AGC module. The range available is 0 to 20dB in steps of 0.1 dB.
- ❑ Freeze Level (dBFS) - Allows you to avoid the undesired gain increase during signal breaks and overshoots by following signal attack. If the input signal level decreases and reaches the freeze level, all the states of AGC (leveler) and transient processor are frozen and kept unchanged until the input signal level rises again. The range available is 0 to -70 in steps of 0.1dB.

Transient Processor

Use the Transient processor to adjust the output level by performing fast gain changes.

To define Transient parameters:

1. In the **Transient Processor** section, configure the following parameters:
 - ❑ Response - Indicates the characteristic of gain change by the transient processor. The response value depends on your program genre. Three values are available from the drop-down list:
 - ❑ Soft - Select when there are just a few level changes or if you want to keep the original dynamic range best (e.g. classical music).
 - ❑ Mid - Select for a mixed program.
 - ❑ Hard - Select for live venues (sport etc.) with frequent unexpected level changes.
2. Max Gain (db) - Limits the maximum amplification allowed by the Transient processor module. The range available is 0 to 20 dB in steps of 0.1 dB.

Limiter

The Audio brick wall limiter guarantees precise peak limiting without any distortion.

To define audio limiter parameters:

- In the **Limiter** section, configure the following parameters :
 - ❑ Max Peak Level (dBFS) - The maximum loudness level. Dynamic audio level adjustment processing will ensure that audio loudness is below Max Peak Level. The default is -6.
 - ❑ Processing - Allows you to define the behavior of the limiter, mostly affecting the release of the limiter audio level reduction. The following processing modes are available from the drop-down menu: Live, Speech, Universal (default) and Classic.

Adjusting NCC Audio Levels

To adjust NCC levels:

1. In the **Logical Output** section, select the required program.
2. Right-click the required audio PID and select **Properties**.
3. In the PID # ES Properties dialog box, make sure that the **Transcoding** check box is selected.
4. Click the **Audio Level Adjustment** section.

Audio Level Adjustment expands to display additional parameters.

5. Select the **Audio Level Adjustment** check box.

Selecting this check box enables ALA according to Level Magic LM™, an adaptive level control that adjusts audio levels from any source at any time to a given reference level.

Enable this option when incoming source levels vary widely between channels (for example, if Service A seems much louder than Service B, or when transient audio level changes within the same channel during commercial breaks, explosions or loud music vs. dialog).

LFE Mode and **Input Gain** become available.

- ❑ **LFE Mode** - Use for multichannel (5.1) streams. Select one of the following two options for LFE control from the drop-down list:
 - ❑ **Unlinked Derived** - Default. LFE follows the Input Gain (dB) configuration of 3/2.
 - ❑ **Unlinked Adjustable** - LFE might have a different Input Gain (dB) configuration than 3/2. Selecting this option also displays the Input Gain (dB) box for LFE.
- ❑ **Input Gain (dB)** - Allows you to configure the input signal level towards the target loudness level that streams into the ALA module. You can configure this parameter and prevent distortion of the input loudness level before the audio is processed in the ALA module. Enter the required value between -20 to +20dB in steps of 0.1dB.

NCC Automatic Gain Control (AGC)

Use the AGC to adjust the output level by performing slow gain changes.

To define gain control parameters:

1. In the **Automatic Gain Control** section, configure the following parameters:



TIP: Loudness Target (dBFS) is the main parameter when configuring the ALA processing module.

- ❑ **Loudness Target (dBFS)** - Allows you to configure the desired output loudness level in LKFS (Loudness, K-weighted, relative to Full Scale). A unit of LKFS is equivalent to a decibel. The range is from -36 to -16. The default level is -24.
- ❑ **Time** - The amount of time the ALA module takes to scale incoming audio with loudness levels not at target. The time range is from 1 second to 9000 seconds.
- ❑ **Max Gain** - Limits the maximum amplification allowed by the AGC module. The range available is 0 to 20dB in steps of 0.1 dB.
- ❑ **Freeze Level (dBFS)** - Allows you to avoid the undesired gain increase during signal breaks and overshoots by following signal attack. If the input signal level decreases and reaches the freeze level, all the states of AGC (leveler) and transient processor are frozen and kept unchanged until the input signal level rises again. The range available is 0 to -70 in steps of 0.1dB.

Chapter 6

Multiscreen Transcoding

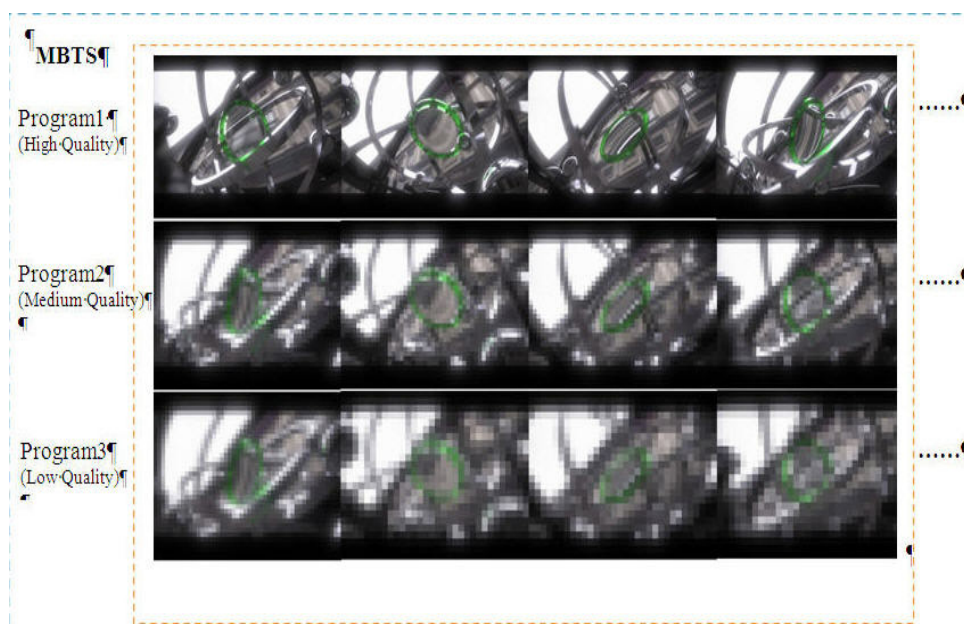
Overview

This version of ProStream 9100 transcodes services and can output them also as multiscreen compliant services. ProStream 9100 produces a valid output for mobile web devices that support multi-bitrate switching such as Apple iPhone, Microsoft Silverlight Smoothing Streaming Player, Adobe Flash Player.



NOTE: ProStream 9100 can simultaneously transcode broadcast streams and multiscreen compliant streams.

To comply with multiscreen specifications, ProStream 9100 outputs an MBTS (Multi Bitrate Transport Stream). MBTS is composed of SPTSs (Single Program Transport Streams), or several profiles that output the same service data in different quality levels. The following illustration shows a typical MBTS with three profiles:



Glossary

The following table lists transcoding multiscreen common terminology.

Table 6–1: Transcoding Multiscreen Terminology

Item	Explanation
ABR	Average Bitrate
CBR	Constant Bitrate

Table 6–1: Transcoding Multiscreen Terminology

Item	Explanation
HD	High Definition video format
MBTS	Multi Bitrate Transport Stream
PTS	Presentation Time Stamp
SAR	Sample Aspect Ratio
SPTS	Single Program Transport Stream
SD	Standard Definition video format
Sub-SD	Video format includes all resolutions that are below the resolutions supported by SD
VBR	Variable Bitrate

HD/SD/Sub-SD Specifications

ACE 5.1 and higher supports a wide range of resolutions to allow flexibility.



NOTE: HD output - any output resolution that is greater than 720 W or 576 H.

Refer to the ProStream 9100 specifications document for HD output supported resolutions.



NOTE: For 1024x768 - If the input is 720p, force the output to be equal to input Vertical resolution (1024x720) and *Input Vertical Resolution Mismatch* alarm is raised. Up conversion (SD to HD) is not supported.

Refer to the ProStream 9100 specifications document for SD and sub-SD output supported resolutions.

Processing Multiscreen Streams

The multiscreen streams outflow the device in MBTSs. Each MBTS includes up to 12 SPTSs, or profiles. The provisioning includes the following stages:

- Defining the required device frequency. See [Setting Device Frequency](#)
- Selecting the required input service and output port.
 - ❑ Input service - The service flows into the device over a GbE port.
 - ❑ Output Port - Multiscreen services outflow over a GbE port. You need to define a multicast IP to outflow the MBTS.

For more information, see [Creating an MBTS Stream](#).

- Configuring the multiscreen parameters - Configuration is done via the Multiscreen page and its tabs:
 - ❑ MBTSs
 - ❑ MBTS Configuration
 - ❑ Profile Configuration
 - ❑ Image Processing

See [Creating an MBTS Stream](#).

Configuration includes:

- ❑ Setting unique stream parameters as explained in the following instructions.
- ❑ Setting parameters common to all streams in an MBTS.



NOTE: Once you configure a transcoded video stream as an multiscreen stream, you cannot configure the video stream via the **Video Transcoding** tab.

You can configure the transcoded audio stream via the **Audio Transcoding** tab and all changes apply to all audio streams in a profile.

Cropping

Cropping is performed on the input stream, before the stream is encoded to other output profiles. You can configure a cropping parameter for top/bottom/left/right.

The cropping range is 0 to 100 pixels for SD or HD input streams. Only even numbers are supported. The default value is zero. You can change the cropping parameters on the fly.

Cropping parameters are specified with respect to full resolution. If the input horizontal resolution is not full-resolution, the cropping parameters are scaled and rounded up to the next even number. Vertical resolution is always full resolution. Therefore, no scaling of cropping is necessary for top and bottom.

Logo Insertion

The Logo Insertion feature places a small user-provided logo image over the input video. The image is static (non-animated) and it can have transparent and semi-transparent regions.

Table 6–2: Logo Insertion Specifications

Specification	Explanation
Insertion location and logo resolution	<ul style="list-style-type: none"> ■ Location - Insertion is performed on the input stream, before it is encoded to other output profiles ■ Resolution - It is assumed that the Logo size matches the full resolution of the input stream. Any changes to input resolution cause the logo to resize proportionally.
Logo insertion file	<p>Logo insertion file should be loaded to the device and meet the following specifications: (For loading the file, see Uploading Logo Insertion Files.)</p> <ul style="list-style-type: none"> ■ Type - PNG file ■ Size - Not larger than 512 Kb ■ Resolution - No smaller than 16x16 and no larger than 1/8 of the maximum source pixels (HD 1080i: $1920 \times 1080 / 8 = 259200$, HD 72P: $1280 \times 720 / 8 = 115200$, NTSC: $720 \times 480 / 8 = 43200$ and PAL: $720 \times 576 / 8 = 51800$). ■ When one of the output profiles is 1080p, the maximum logo resolution cannot exceed 1/16 of the source pixels (HD 1080p: $1920 \times 1080 / 16 = 129600$).

Table 6–2: Logo Insertion Specifications

Specification	Explanation
Position	User configurable. You can select a reference position that is based on the active video region and indicates a horizontal offset and vertical offset, which are based on the input full resolution, from that reference position. Reference positions are: top left corner, top right corner, bottom left corner and bottom right corner.
Position Offset	User configurable in pixels. Offset indicates the distance of the logo from the corner's edges <i>Note:</i> If a portion of the logo is outside of the active display region, the alarm <i>Logo Display Error</i> is raised.
Transparency	User configurable. From 0 to 100% (0 = Opaque, 100 = Invisible).
On the fly configuration	You can change configuration on the fly. Changes may cause the logo to disappear for a few seconds.

Setting Device Frequency

To set device frequency:

1. Log into the device as explained in [Logging into the Device](#).
2. Select **Administration > Video Processing**.
3. Open the **Video Frequency (Hz)** list and select either 50 or 60 Hz.

Creating an MBTS Stream

To create an MBTS stream:

1. From the Multiscreen tab, click the **MBTSs** pane.
You define the input service and the output GbE port for the multiscreen stream in this page.
2. Click **Add**.
The MBTS# Properties dialog box appears.

3. To create a multiscreen stream, click the **Input TS** drop-down list and select the required input.
4. To create a multiscreen stream, click the **Output Port** drop-down list and select the required output.
5. Click the **# of Profiles** Up / Down arrows to select the number of profiles for the multiscreen stream.

MBTS is composed of SPTs (Single Program Transport Streams), or several profiles that output the same service data in different quality levels.

6. Click the **Original Video Resolution** drop-down list and select the input video format, either HD or SD.

The output bitrate ranges and resolution depend on the input video format. Select the input video resolution.

Original Coding Format is for viewing purposes only.

7. In the **Destination IP Address** field, enter a multicast IP address to outflow the MBTS.

This multicast IP address with a UDP port specific for each multiscreen profile, define the SPTS included in the MBTS.

The MBTS appears in the MBTS dialog. You can remove it with the **Remove** button or press the **Edit** button to edit the MBTS.

MBTS Properties

This section enables you to view the properties of each MBTS and to configure its name and input video format. Each change performed in this section is automatically updated in the **MBTS # Properties** dialog box.

To view MBTS properties:

1. Focus on the **MBTS Properties** section.
2. Open the **MBTS** list and select the required MBTS.
3. In **Program Name**, enter a the name of the MBS.

of Profiles is read only. View the number of profiles for the multiscreen stream. MBTS is composed of SPTSs (Single Program Transport Streams), or several profiles that output the same service data in different quality levels.

Input TS, Output TS and Output Port are for viewing only.

4. **Original Video Resolution** - Select the input video format, either HD or SD then select the input video resolution.
5. **Original Coding Format** - Read only. View the input coding format.
6. **Destination Multicast Address** - Read only. View the multicast IP address to outflow the MBTS.
7. To define the output, select the relevant profile in the Profiles Configuration of the MBTS Configuration pane and do the following:
 - a. In **Destination Multicast**, enter a multicast IP address to outflow the MBTS. This multicast IP address with a UDP port is specific for each multiscreen profile. Define the SPTS included in the MBTS. For UDP definition, see step 7.2.
 - b. In **PMT PID**, enter the PMT PID of all programs included in the profile.
8. Output bitrate ranges and resolution depend on the input video format. Prior to the profile configuration, you should define the input video format. To define the input video format, focus on the **Input Properties** section. Open the **Input Video Format** list and select either **HD** or **SD**.

The **New** button is enabled and the **Multiscreen Profiles** section is updated according to the selected input video format. Once you select an input, the **Select Input** option is removed.

Configuring MBTS Profile

To configure an MBTS profile:

1. Log into the device as explained in [Logging into the Device](#).
2. Select **Multiscreen > MBTS Configuration**:



NOTE: This page appears only if MBTSs are configured.

MBTS: sd m1

[MBTSs](#)
[MBTS Configuration](#)
[Profile Configuration](#)
[Image Processing](#)

Profiles Configuration

Profile Name	Video Resolution	Destination Multicast	Destination UDP	PMT PID	Reserved Bitrate (Kbps)	Transport Bitrate (Mbps)	PMT Descriptors
Profile 1	640x480	236.54.2.6	1001	181 (0xB5)	200	2.908	Edit
Profile 2	640x480	236.54.2.6	1002	181 (0xB5)	200	2.908	Edit
Profile 3	640x480	236.54.2.6	1003	181 (0xB5)	200	2.908	Edit
Profile 4	640x480	236.54.2.6	1004	181 (0xB5)	200	2.908	Edit
Profile 5	640x480	236.54.2.6	1005	181 (0xB5)	200	2.908	Edit

[Add](#) [Remove](#)

PID Selection

Name	Input PID	Type	Original Coding Format	Output PID	Coding Format	ES Bitrate (Kbps)	Used in (Profiles)	PMT...
Video for Profile 1	1281 (0x501)	Video	2 (0x02) MPEG-2	1281 (0x501)	27 (0x1B) AVC Video	2500	1	Edit
Audio_1	1282 (0x502)	Audio	129 (0x81) AC-3 (ATSC) Audio	1282 (0x502)	AAC In ADTS (0xF)	96	12	Edit
Video for Profile 2	1281 (0x501)	Video	2 (0x02) MPEG-2	1281 (0x501)	27 (0x1B) AVC Video	2500	1	Edit
Video for Profile 3	1281 (0x501)	Video	2 (0x02) MPEG-2	1281 (0x501)	27 (0x1B) AVC Video	2500	1	Edit
Video for Profile 4	1281 (0x501)	Video	2 (0x02) MPEG-2	1281 (0x501)	27 (0x1B) AVC Video	2500	1	Edit
Video for Profile 5	1281 (0x501)	Video	2 (0x02) MPEG-2	1281 (0x501)	27 (0x1B) AVC Video	2500	1	Edit

[Remove](#) [Copy Selected](#)

Common Video Configuration

Bitrate Mode: CBR
 Output Aspect Ratio: Follow the input
 IDR Interval (Sec): 2
 Bitrate Settings Applies to: TS Level
 Close Caption Conversion: ATSC A/72
 MCTF: Off
 Insert IDR: ☒
 Insert B Frames: ☒

- Click the **MBTS** drop-down list and select the require MBTS.
- To define a profile, focus on the **Profiles Configuration** section and do the following:

MBTS: sd m1

[MBTSs](#)
[MBTS Configuration](#)
[Profile Configuration](#)
[Image Processing](#)

Profiles Configuration

Profile Name	Video Resolution	Destination Multicast	Destination UDP	PMT PID	Reserved Bitrate (Kbps)	Transport Bitrate (Mbps)	PMT Descriptors
Profile 1	640x480	236.54.2.6	1001	181 (0xB5)	200	2.908	Edit
Profile 2	640x480	236.54.2.6	1002	181 (0xB5)	200	2.908	Edit
Profile 3	640x480	236.54.2.6	1003	181 (0xB5)	200	2.908	Edit
Profile 4	640x480	236.54.2.6	1004	181 (0xB5)	200	2.908	Edit
Profile 5	640x480	236.54.2.6	1005	181 (0xB5)	200	2.908	Edit

[Add](#) [Remove](#)

- To create a multiscreen profile click **Add**. A blank record appears and you can define the profile parameters.
- Under **Profile Name**, view the name of the profile.
- Under **Video Resolution**, select the required resolution.
 - ☐ HD
 - ☐ SD
 - ☐ Sub SD

- d. Under **Destination Multicast**, enter the required multicast IP of the profile. This multicast IP address with a UDP port specific for each multiscreen profile, define the SPTS included in the MBTS.
- e. Under **Destination Port**, define the output UDP port of the profile.
- f. Under **PMT PID**, enter the PMT PID of all programs included in the profile.
- g. **Reserved Bitrate** - The total bitrate required for all passthrough audio/data PIDs that are attributed to this MBTS profile. If you changed the passthrough PID configuration, enter it under **Reserved Bitrate**, and the appropriate bitrate following your changes to passthrough data/audio PIDs. Reserved Bitrate is automatically calculated, but you can configure it in case the passthrough PID configuration is changed and the total bitrate of the passthrough PIDs within the output TS. The reserved bitrate under is calculated:
 - ❑ In CBR Mode, Video Bitrate + Transcoded Audios (TS) Bitrate + PSI + Reserved Bitrate (for all passthrough streams)
 - ❑ In ABR Mode - (Video Bitrate)*4 + Transcoded Audios (TS) Bitrate + PSI + Reserved Bitrate (for all passthrough streams)

If automatic calculation adds a high overhead of Null packets to the output TS, you can adjust it by resetting the Reserved Bitrate.

- h. Under **Transcode Bitrate**, enter the required bitrate from the available range.
 - ❑ HD
 - ❑ SD
 - ❑ Sub SD
- i. Under **PMT Descriptors**, edit the PMT descriptors. See [Configuring PMT](#).

Editing the Multiscreen Profiles List

To delete multiscreen profiles:



NOTE: Removing/adding multiscreen stream from a profile is service affecting for all streams in the profile.

1. Select **MBTSs > Profiles Configuration** section.

Profile Name	Video Resolution	Destination Multicast	Destination UDP	PMT PID	Reserved Bitrate (Kbps)	Transport Bitrate (Mbps)	PMT Descriptors
Profile 1	640x480	236.54.2.6	1001	181 (0xB5)	200	2.908	Edit
Profile 2	640x480	236.54.2.6	1002	181 (0xB5)	200	2.908	Edit
Profile 3	640x480	236.54.2.6	1003	181 (0xB5)	200	2.908	Edit
Profile 4	640x480	236.54.2.6	1004	181 (0xB5)	200	2.908	Edit
Profile 5	640x480	236.54.2.6	1005	181 (0xB5)	200	2.908	Edit

2. Open the **MBTS** list and select the required MBTS.
3. In **Profiles Configuration**, select the required profile(s).

4. Click **Remove**.

MBTS: sd m1

Profile Name	Video Resolution	Destination Multicast	Destination UDP	PMT PID	Reserved Bitrate (Kbps)	Transport Bitrate (Mbps)	PMT Descriptors
<input type="checkbox"/> Profile 1	720x404	236.54.2.6	1001	181 (0x85)	200	1.887	Edit
<input type="checkbox"/> Profile 2	720x480	236.54.2.6	1002	181 (0x85)	200	1.887	Edit
<input type="checkbox"/> Profile 3	656x368	236.54.2.6	1003	181 (0x85)	200	1.887	Edit
<input checked="" type="checkbox"/> Profile 4	720x432	236.54.2.6	1004	181 (0x85)	200	1.887	Edit
<input type="checkbox"/> Profile 5	720x480	236.54.2.6	1005	181 (0x85)	200	1.887	Edit

[Add](#) [Remove](#)



NOTE: If you remove all profiles from an MBTS, the MBTS is deleted as well.

Configuring Profile PIDs

Each profile may have up to 25 PIDs. Each profile should have a transcoded video stream, it may have multiple transcoded audio streams, and may have data streams.

To define/view the streams:

1. Select **Multiscreen > MBTS Configuration**.



NOTE: This page appears only if MBTSs are configured.

2. Open the **MBTS** list and select the required MBTS.
3. To define profile PIDs, focus on the **PID Selection** section:
 - a. Under **Name**, view the name of the PID. The name indicates whether is a video, audio, or data PID.
 - b. Under **Input PID**, select the input PID.
 - c. Under **Type**, view the type of the PID.
 - d. Under **Original Coding Format**, for a video PID, view the coding format of the PID. For an audio or data PID, select the required input coding format.
 - e. Under **Output PID**, enter the required output PID.
 - f. Under **Coding Format**, for a video PID, view the output coding format of the PID. For an audio or data PID, select the required output coding format.
 - g. Under **ES Bitrate (bps)**, open the bitrate list and select the required bitrate.
 - h. Under **Used in (Profiles)**, view the profiles this PID is associated with.
 - i. Under **PMT Descriptors**, edit the PMT descriptors. See [Configuring PMT](#).
 - j. To duplicate the stream, see [Duplicating Audio/Data Streams](#).

Configuring Common Video Parameters

To configure common video parameters:

1. Select **Multiscreen > MBTS Configuration**:



NOTE: This page appears only if MBTSs are configured.

MBTSS

MBTS Configuration

Profile Configuration

Image Processing

MBTS: sd m1

Profiles Configuration

Profile Name	Video Resolution	Destination Multicast	Destination UDP	PMT PID	Reserved Bitrate (Kbps)	Transport Bitrate (Mbps)	PMT Descriptors
Profile 1	640x480	238.54.2.6	1001	181 (0x85)	200	2.908	Edit
Profile 2	640x480	238.54.2.6	1002	181 (0x85)	200	2.908	Edit
Profile 3	640x480	238.54.2.6	1003	181 (0x85)	200	2.908	Edit
Profile 4	640x480	238.54.2.6	1004	181 (0x85)	200	2.908	Edit
Profile 5	640x480	238.54.2.6	1005	181 (0x85)	200	2.908	Edit

[Add](#) [Remove](#)

PID Selection

Name	Input PID	Type	Original Coding Format	Output PID	Coding Format	ES Bitrate (Kbps)	Used in (Profiles)	PMT...
Video for Profile 1	1281 (0x501)	Video	2 (0x02) MPEG-2	1281 (0x501)	27 (0x1B) AVC Video	2500	1	Edit
Audio_1	1282 (0x502)	Audio	129 (0x81) AC-3 (ATSC) Audio	1282 (0x502)	AAC In ADTS (0xF)	96	12	Edit
Video for Profile 2	1281 (0x501)	Video	2 (0x02) MPEG-2	1281 (0x501)	27 (0x1B) AVC Video	2500	1	Edit
Video for Profile 3	1281 (0x501)	Video	2 (0x02) MPEG-2	1281 (0x501)	27 (0x1B) AVC Video	2500	1	Edit
Video for Profile 4	1281 (0x501)	Video	2 (0x02) MPEG-2	1281 (0x501)	27 (0x1B) AVC Video	2500	1	Edit
Video for Profile 5	1281 (0x501)	Video	2 (0x02) MPEG-2	1281 (0x501)	27 (0x1B) AVC Video	2500	1	Edit

[Remove](#) [Copy Selected](#)

Common Video Configuration

Bitrate Mode: CBR

Output Aspect Ratio: Follow the input

IDR Interval (Sec): 2

Bitrate Settings Applies to: TS Level

Close Caption Conversion: ATSC A/72

MCTF: Off

Insert IDR: ☒

Insert B Frames: ☒

2. Open the **MBTS** list and select the required MBTS.
3. To define the parameters common to all multiscreen streams, focus on the **Common Video Configuration** section and do the following:
 - a. Open the **Bitrate Mode** list and select either of the following:
 - ☐ CBR - Constant Bitrate
 - ☐ ABR - Average Bitrate
 - b. **Output Aspect Ratio** – Allows you to match picture to type of screen, standard or wide screen. To configure output aspect ratio, open the **Output Aspect Ratio** list and select one of the following:
 - ☐ Follow Input
 - ☐ 4:3
 - ☐ 16:9



NOTE: To form a 16:9 image when the input aspect ratio is 4:3, the input image is rescaled with black pixel columns added to the left and right sides of the rescaled image (i.e. pillar-boxing).

- c. In **IDR Interval (sec)**, enter the required interval between the IDR frames.
- d. Open the **Bitrate Settings Applies to:** list and select either of the following:
 - ☐ TS Level - The baseline for calculating the output transport stream bitrate includes the ES bitrate and the TS header encapsulation overhead
 - ☐ ES Level - The baseline for calculating the output transport stream bitrate includes

only the ES bitrate

- e. Open the **Close Caption Conversion** list and select either of the following:
 - ☐ ATSC A/72
 - ☐ Discard



NOTE: Closed caption/V-Chip information is passed through only for full frame rate profiles (29.97fps), due to standards restriction.

- f. **MCTF** (Motion-Compensated Temporal Filtering) - by default it is off. Mctf affects the video quality and reduces noise. If the service bit rate is low it is recommended to use strong Mctf. However, strong Mctf affects the sharpness of the picture. To select the required Mctf, open the **Mctf** list and select the required level ranging from very weak to very strong.
- g. **Insert IDR** - Select to insert IDR frames.
- h. **Insert B Frames** - Select to insert B frames.

Configuring MBTS Profiles

To configure MBTS Profiles:

1. Select **Multiscreen > MBTS Configuration**:



NOTE: This page appears only if MBTSs are configured.

2. Open the **MBTS** list and select the require MBTS.
3. To define profile parameters, in **PID Selection**, select the required video PID.

The **Profiles Video Configuration** section appears.

The screenshot shows two panels from a software interface. The top panel, titled 'PID Selection', is a table with columns: Name, Input PID, Type, Original Coding Format, Output PID, Coding Format, ES Bitrate (Kbps), Used in (Profiles), and PMT. It lists several video and audio profiles. The bottom panel, titled 'Profiles Video Configuration', contains two sections: 'Common Video Configuration' and 'Profiles Video Configuration'. The 'Common' section includes settings for Bitrate Mode (CBR), Output Aspect Ratio (Follow the input), IDR Interval (2), Bitrate Settings Applies to (TS Level), Close Caption Conversion (ATSC A/72), MCTF (Off), Insert IDR (checked), and Insert B Frames (checked). The 'Profiles' section includes settings for Output PID (1281 (0x501)), Bitrate (Mbps) (1.5), Video Resolution (720x404), Profile (Main), Encoding Level (Automatic), and Frame Rate (fps) (29.97/25).

4. **Output PID** - Select the required output PID.
5. **Bitrate (Mbps)** - Select the required output bitrate of the video PID.
6. **Video Resolution** - Select the required output resolution.
 - ☐ HD
 - ☐ SD
 - ☐ Sub SD
7. **Profile** - Select the required profile. You can select: Baseline, Main or High.
8. **Encoding Level** - Select either automatic, or a level defined by the H.264 specifications:

- ❑ Automatic - Encoding level is automatically defined according to the frame size, frame rate and max bit rate.
 - ❑ Available levels: 1.1, 1.2, 1.3, 2.0, 2.1, 2.2, 3.0, 3.1, 3.2, 4.0, 4.1. If the configurable level does not comply with the configured frame size, frame rate and bitrate, ACE accepts the configured level and raises the *Encoding level violation* alarm.
9. **Frame Rate**, select either of the following:
- ❑ 29.97 / 25 - Applies to Full frame rate, where:
 - ❑ 29.97 fps for 60Hz (default)
 - ❑ 25 fps for 50Hz (default)
 - ❑ 14.98 / 12.5 - Applies to Half frame rate, where:
 - ❑ 14.985 fps for 60Hz (default)
 - ❑ 12.5 fps for 50 Hz

Configuring Audio Transcoding PID

The **Audio TX Configuration** section appears once you select an audio PID in **PID Selection** section.

To configure an Audio Transcoding PID:

1. Select **Multiscreen > MBTS Configuration**:



NOTE: This page appears only if MBTSs are configured.

2. Open the **MBTS** list and select the required MBTS.
3. To define the parameters of the audio PID, select in **PID Selection** the required audio PID.
4. **Output PID** - Select the required output PID.
5. **Coding Format** - Enables you to configure the compression type and to allocate transcoding resources. Select one of the following output coding formats: Coding format options depend on the selected input stream type as the following table lists:

Input Stream Type	Coding Format Options
(0x3) MPEG-1 Audio	Any coding format. Not configurable
AC-3 ATSC	
E-AC-3 ATSC	
AC-3/E-AC-3 DVB	Any
	AC-3
	E-AC-3
AAC	Any input coding format
	AAC LC
	ACC HE

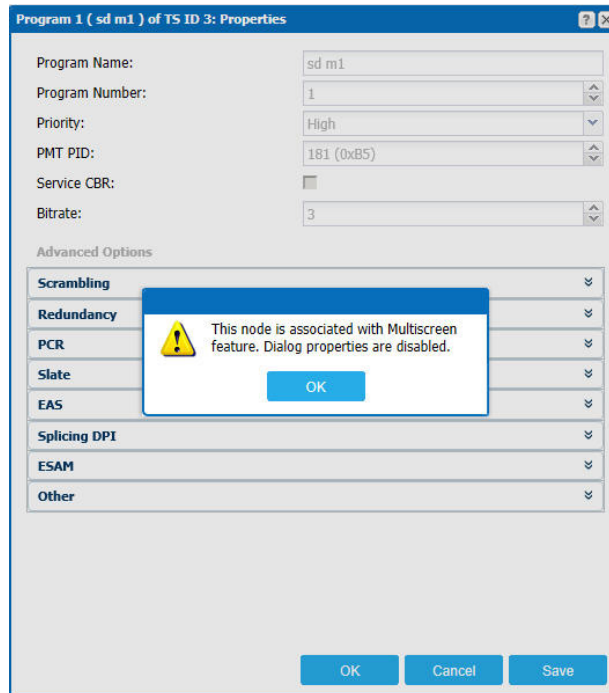
If the coding format of the input stream is unknown, select Any. If a low MHz decoder (AAC LC / AC3) is selected and the actual decoding format is a high MHz decoder (AAC HE / E-AC3), an alarm is raised.

6. **Input ES Type** - Select the type of the input elementary stream.
7. **ES Type** - read only. View the type of the input elementary stream.
8. **Input Coding Mode** - Enables you to define the number of channels and to allocate transcoding resources. Select one of the following coding modes: Any, Stereo, or Multichannel. Coding mode options depend on the selected input stream type as the following table lists:

Input Stream Type	Coding Format Options
(0x3) MPEG-1 Audio	Any coding format. Not configurable
AC-3/E-AC-3 all flavors ACC	Any
	Stereo/Mono
	Multichannel

9. **Sample Rate (kHz)** - Read only. Sampling rate is 48 kHz and it is not converted.
10. **ES Bitrate (Kbps)** - Select the required bitrate, The ES Bitrate list is updated according to the output stream type and the selected output codec.
11. **MPEG 1 Layer II / AC-3 EAC-3 / AAC** - This section is updated according to the selected Coding Format. For details see:
 - MPEG 1 Layer II - [Specific MPEG-1L2 Configuration](#).
 - AC 3 EAC-3 - [Specific Dolby® AC-3™/E-AC-3 Configuration](#).
 - AAC - [Specific AAC Configuration](#).
12. **Effective Bitrate (Kbps)** - Read only. Displays the actual bitrate.

The multiscreen transcoding is configured via the **MBTS** menu only. However, if you select in the Logical Output pane a multiscreen service > **Properties**, the Properties page appears with the following message. Once you click OK in the message, the Properties dialog opens with limited configuration. The same applies for PIDs.



Duplicating Audio/Data Streams

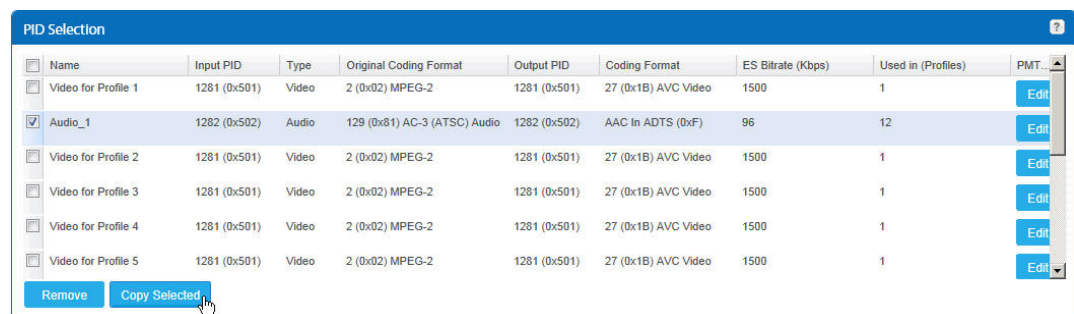
You can transcode/pass through each audio/data stream multiple times, with different output PID and transcoding parameters. You can also configure whether to enable each audio/data stream per specific MBTS Profile.

Each MBTS can have up to 25 streams.

The duplication of audio/data streams is done across all MBTS profiles.

To duplicate a stream:

1. Select **Multiscreen > MBTS Configuration > PID Selection** section.



2. Select the required audio/data PIDs.
3. Click **Copy Selected**.

The required PIDs are copied and appear below the original PID.



NOTE: To remove PIDs, use **Remove**.

Associating ESs with a Profile

To associate the streams with a profile, select the required profile/profiles. By default, stream are associated to all profiles.

To select the required profile:

1. Select **Multiscreen > Profile Configuration**:

Include	Input PID	Type	Original Coding Format	Output PID	Coding Format
<input checked="" type="checkbox"/>	515 (0x203)	Audio	129 (0x81) AC-3 (ATSC) A...	515 (0x203)	AAC In ADTS (0xF)
<input checked="" type="checkbox"/>	514 (0x202)	Audio	129 (0x81) AC-3 (ATSC) A...	514 (0x202)	AAC In ADTS (0xF)
<input checked="" type="checkbox"/>	513 (0x201)	Video	27 (0x1B) AVC Video	513 (0x201)	27 (0x1B) AVC Video

2. Open the **MBTS** list and select the required MBTS.
3. Open the **Profile** list and select the required profile.
The **PID Selection** section is updated with the PIDs of the MBTSs.
4. Under, **Include**, select/de-select the PIDs to be included/excluded

Multiscreen Image Processing

Multiscreen image processing includes the following features:

- Logo Insertion - See [Logo Insertion](#).
- Cropping - See [Cropping](#).

To configure Logo Insertion and Cropping:

1. Select **Multiscreen > Image Processing**:

MBTS: hd h 1080i

Logo Insertion

Enable Logo Insertion: ☐

Cropping

Enable Cropping: ☐

2. Open the **MBTS** list and select the required MBTS.

3. Open the **Logo ID** to select the required logo file. You need to upload logo files via the **Assets** tab. See [Uploading Logo Insertion Files](#).
4. To configure Logo Insertion, focus on the **Logo Insertion** section.
5. Select **Enable Logo Insertion**.

- a. To enable the **Logo Insertion** section, select **Logo Insertion**. For logo insertion specifications, see [Logo Insertion](#).
- b. Open the **Logo Position** list and select the required position for the logo: Top Left, Top Right, Bottom Left, Bottom Right.
- c. In **Vertical Offset** and **Horizontal Offset**, select the required distance, respectively.
- d. In **Transparency**, enter the required value, or move the slider.

To configure Cropping:

1. In the Cropping section, select **Enable Cropping**.

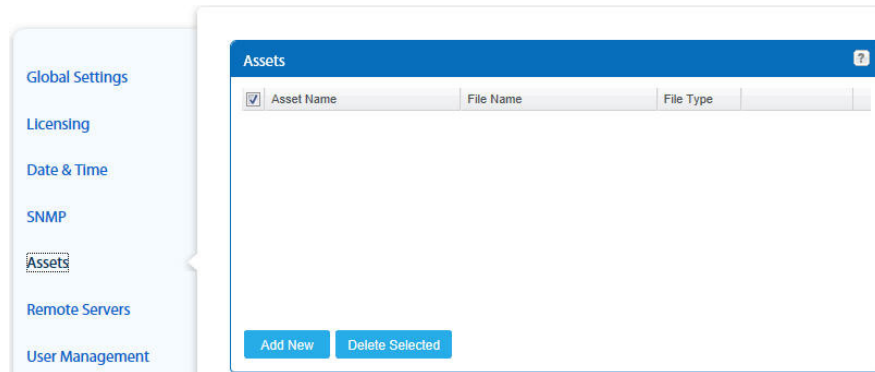
Enter the desired cropping values in the **Top**, **Left**, **Bottom** and **Right** boxes. Enter even-numbered values between 0 to 100. See [Cropping](#).

2. To send the configuration to the device, click **Apply**.

Uploading Logo Insertion Files

To upload a logo file:

1. Select **Administration > Assets**.



2. Click **Add New**.
3. Click **Browse**, and navigate to the required logo file.
4. Click **Open**.

The file uploads and its name appears in the dialog.

5. In **Uploading Asset**, click **OK**.

The required file is loaded and the **Assets** page is propagated with the loaded file.

6. Select **Multiscreen > Image Processing > Logo Insertion**.
7. **Enable Logo Insertion** - Select this option to enable logo insertion.

The Logo Insertion list is populated with the loaded files.

8. Open the **Logo ID** list and select the required file.

Splicing Overview

Digital Programming Insertion (DPI), or Splicing, is the process in which the main feed is spliced to allow the insertion of another stream, usually an ad. The transition from the main feed to the inserted stream and vice versa should be a seamless, frame-accurate splice that results in a flawless broadcast.

DPI Standards

A splicing standard-based solution supports the following standards:

SCTE35 - Digital Program Insertion Cueing Message for Cable protocol. This is a protocol for in band cue messages that defines the potential splice time-slots (avails) in the stream.

SCTE30 – Digital Program Insertion Splicing API. This is a communication protocol between AD Servers and Splicers, to communicate splice messages.

DPI Terminology

Network feed - Another name for the main feed, that is, the feed to be spliced.

Avail - Time slots for inserting content into the network feed. The avails are transmitted over a SCTE35 PID, or SCTE30 PID.

Cue message - Sent from the Splicer to the AD server via SCTE30. The cue message informs the AD server of an avail to allow the AD server to retrieve the ad spots scheduled for that avail.

Insertion channel - The channel over which the AD server streams the ads to the Splicer. The Insertion channel is an IP interface.

Splice In Point and Splice Out Point - Splice In Point indicates the frame for inserting content into the network feed. Splice Out Point indicates the frame for ending the insertion and returning to the network feed.



Splice in point

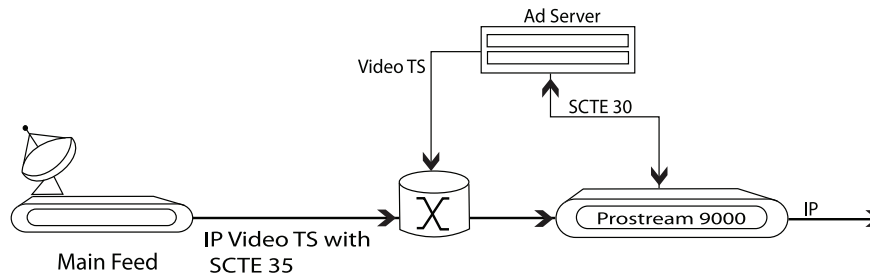
Splice out point

Ad - A short commercial clip, typically 30 seconds long.

Back-to-Back Insertion (B2B) - When more than one ad is inserted, the ads are inserted one after the other without returning to the network feed.

Components of the Splicing Solution

The following illustration shows the main components of the Splicing solution:



AD Server

The AD server does the following:

- **Manages the splicing** - The AD server initiates the splicing and defines when to splice, what to insert, and for how long. To control the splicing it communicates with the Splicer over the SCTE30 protocol.
- **Controls the Insertion channel** - The AD server contains all the insertion content and streams the ads as required over the Insertion channel to the Splicer. The Insertion channel interface is either IP or ASI as the above illustrations show.
- **Interfaces with an NTP server** - Both AD server and Splicer interface with the same NTP server. The AD server receives time signals from the NTP server and synchronizes its internal clock with the external NTP clock. This clock is also utilized by the Splicer. Both the Splicer and AD server share a common time-base to ensure maximum synchronization between them.

Digital Splicer

ProStream 9100, the digital Splicer in this solution, allows a smooth and seamless transition from one stream to another. The Splicer performs the following:

- **Receives main feed** - The Splicer receives the main feed with SCTE35 data over its IP interface.
- **Encapsulates SCTE35 data** - The Splicer encapsulates SCTE35 data as SCTE30 Cue messages. The Splicer sends these messages to the AD server to inform it of an avail and to allow the AD server to initiate a splice.
- **Receives Splice requests and insertion content** - The Splicer receives from the AD server a splice request and the insertion content and executes a splice at the required time. Without SCTE35, AD server can initiate a splice request via SCTE30.
- **NTP Interface** - Allows the Splicer to receive a time signal from the system NTP server and to synchronize its clock according to the NTP time.

AD Server Specifications

ProStream 9100 is a SCTE35/30 compliant Splicer. It is integrated with Vigor AD Server. The following table shows the specifications of these AD servers.

Table 7–1: Vigor Specification

Item	Specification
Insertion channel	IP
Splice request mode	PIDs mode
Splicing request initiation	Based on an external system

Tips for AD Server Configuration

When configuring the AD server for working with ProStream 9100 as a splicer, it is recommended to configure the parameters as follows:

Table 7–2: Tips for AD Server Configuration

Parameter	Explanation	Recommended Value
Splice Request Pre-roll	How much time should lapse between when the AD server sends the splice request and the splice event	3.5 seconds
AD Streaming Pre-roll	How much time should lapse between when the AD server streams the ad and the splice event	0.9 seconds

Configuring the Splicer

Defining Splicer–AD Server Communication Parameters

To allow the Splicer and AD server to communicate, define the following parameters. The value of these parameters must be identical for both the Splicer and AD server. The following instructions guide you on how to configure the Splicer via the web client. For AD server configuration, see AD server documentation.

- Splicer name - A unique name of the Splicer. See [Defining Splicer Names](#).
- Splicer IP address and SCTE30 port - The default SCTE30 port is 5168. See [Defining the SCTE30 Port and Allocating Resources](#).
- Services - Enter a name for each spliceable service. See [Configuring Spliceable Services & SCTE35 PID](#).
- Insertion Channel - In the Splicer, verify that the input port over which the Splicer receives the Ad insertion is enabled. In the AD server configuration, verify that the port settings match this port.
- NTP Server - Enter the IP address of the NTP server and verify that NTP communication is enabled. See [Synchronizing Splicer Time](#).

Once the AD server is up and running, it sends an Initiation request via SCTE30 for each spliceable service. If the configuration is valid, the Splicer sends a positive Initiation response and the AD server and Splicer communicate.

Defining Splicer Names

To define a splicer name:

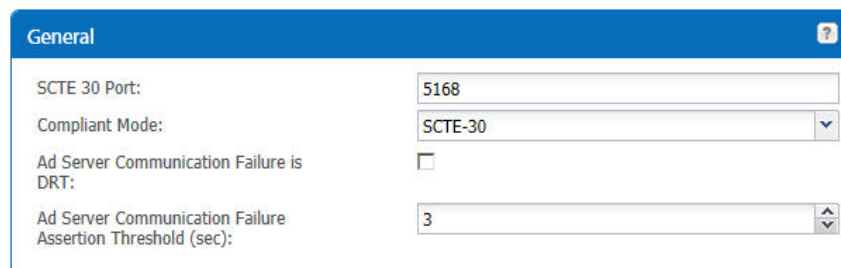
- Do one of the following:
 - Select **Platform > HW Inventory > Platform Properties**.
 - Select **Administration > Global Settings > General**.
- In **Device Name**, enter the name of the Splicer.

When configuring the AD server, use this name as the Splicer name.

Defining the SCTE30 Port and Allocating Resources

To define and allocate an SCTE30 port:

- Select **Platform > DPI**:



The screenshot shows a web interface window titled "General" with a question mark icon in the top right corner. It contains the following configuration fields:

- SCTE 30 Port:** A text input field containing the value "5168".
- Compliant Mode:** A dropdown menu with "SCTE-30" selected.
- Ad Server Communication Failure is DRT:** An unchecked checkbox.
- Ad Server Communication Failure Assertion Threshold (sec):** A spinner control with the value "3" displayed.

- In **SCTE30 Port**, enter the port number via which the AD server manages the splicer.
The default is 5168.
- Open the **Compliant Mode** and select either of the following:
 - SCTE30
 - DVS
- Ad Server Communication Failure is DRT** - Select this check box to set a communication failure with the ad server as a DRT (Device Redundancy Trigger).
- Ad Server Communication Failure Assertion Threshold (sec)** - Enter the period of time to wait before asserting a DRT.
- Click **Apply**.

Synchronizing Splicer Time

See [Network Time Protocol \(NTP\)](#).

Configuring Spliceable Services & SCTE35 PID

To splice a service, configure it as a spliceable service. Spliceable services flow into the device and out of the device via a GbE port of the GbE 4G module.

To configure the registration mode of the SCTE35 PID:

- In the web client, in **Logical Output**, select the required program.

2. In the drop-down menu, select **Properties**. *Network Time Protocol (NTP)*
3. Select the **Splicing DPI** Section:

The screenshot shows a window titled "Splicing DPI". It contains three fields: "Splice Enable" with a checked checkbox, "DPI Mode" with a dropdown menu showing "PID", and "PID" with a text box containing "256 (0x100)".

4. Select **Enable Splicing**.
5. To configure the registration mode, open the **DPI Mode** list and select one of the following options:
 - ❑ **None** - Do not register to receive any SCTE35 message
 - ❑ **PID** - Identify and register the DPI PID according to its PID ID. Once you select PID, the PID box appears. In the PID box, enter the required PID number.
 - ❑ **ES Type** - Identify and register the DPI PID according to its ES Type. Usually SCTE35 PID is type 0x86.
 - ❑ **Component** - Identify and register the DPI PID according to the required component parameters. Once you select Component, the **Service** and the **Component** boxes appear. Enter the required service details and the required component ID.
 - ❑ **RSS** - Identify and register the DPI PID according to the ID of the configured Reference Service. Once you select RSS, the service box appears. Enter the required service ID.

Configuring Data PIDs

To configure a Data PID:

1. In the web client, in Logical Output, select the required program.
2. Select **Program > Properties > Splicing DPI** and select **Splice Enable**.
3. Select the data PIDs of the service and from the drop-down menu select **Properties**.
4. In the PID# Properties dialog, focus on DPI.

The screenshot shows a dialog box titled "PID 32 (0x20) of Program 1 (hd h 1080i) on TS ID 3: ES Properties". It has several sections: "Output PID" (32 (0x20)), "ES Type" (6 (0x6) Private Data), "Source" (Remux Mode: PID, Input TS: #1 (TS ID: 1), Input PID: 30 (0x1E), Reference PCR Input PID: 8191 (0x1FFF)), "Advanced Options" (Redundancy Triggers, PCR, DPI), and "Advanced". The DPI section is expanded, showing "Ad PID Selection Policy" set to "Replace (Fallback: Play)". At the bottom are "OK", "Cancel", and "Save" buttons.

5. To coordinate between network PIDs and AD server PIDs, open the **Ad PID Selection Policy** list and select one of the following options:
 - ❑ Replace (Fallback: Block) - Try to match Ad PID to network PID. If a matching PID is not found, block the network PID.
 - ❑ Replace (Fallback: Play) - Try to match Ad PID to network PID. If a matching PID is not found, play the network PID.
 - ❑ Always Play Network PID - Do not try to match Ad PID to network PID. Always play the network PID
 - ❑ Block PID During Ad - Do not try to match Ad PID to network PID. Always block the network PID
6. Click **OK**.

Monitoring Splicing

To monitor splicing activity, see [Splicing Logging](#).

CAS Overview

The Conditional Access System (CAS) prevents unauthorized viewing of programs by scrambling services that later on can be decrypted using the correct decrypting key.

ProStream 9100 devices support the following CAS mode:

- DVB CSR scrambling - ProStream 9100 may be used as a DVB-CSA scrambler over its ASI and GbE interfaces. ProStream 9100 is fully-integrated and certified to work with the following CA Systems:
 - NagraVision
 - NDS
 - Irdeto
 - Viaccess
 - Conax

When working as a scrambler, the following options apply:

- DVB encryption with external or internal EIS. See [Using Internal EIS](#).
- BISS - See [BISS Overview](#).
- Virtual IP Address - See [Setting ETH1 and ETC2 Port Parameters](#).

Setting General CAS Parameters

Setting the general CAS parameters comprises the following procedures:

- Set communication parameters between ProStream and EIS.
- Set the Crypto Period Duration.
- Set communication parameters between ProStream and ECMG.
- Allocate ECM PIDs.
- Set communication parameters between ProStream and EMMG.
- Allocate EMM PIDs.

Setting CAS General Parameters

To set CAS general parameters:

1. Select **CAS & BISS > General > General** section.
2. In **CAS Mode**, select one of the following options:
 - DVB - Default option. CAS that supports the DVB protocol
 - AES CBC - CAS that supports the Advance Encryption Standard (AES) CBC protocol
 - AES CBC (Irdeto) - CAS that supports the Advanced Encryption Standard (AES) CBC (Irdeto) protocol
 - AES ECB - CAS that supports the Advance Encryption Standard (AES) protocol
 - AES ECB-T - CAS that supports the Advance Encryption Standard (AES) ECB-T (Verimatrix) protocol

3. In the **CP Duration (Sec)** box, type the required value to set how often ProStream changes the encryption key.

The Crypto Period is indicated in seconds and the valid range is 5 - 7200.

4. **Delay ECM Replacement (mSec)** - Select the amount of time, in milliseconds, that elapses until ECM replacement takes place.
5. Select **CW Conformance** to enable CW conformance.
6. **Set Bit 54 to 0** - when selected, bit 54 of the CW is set to 0.
7. **Selective Encryption** - By default, this check box is not selected.

When selected, it enables the trick mode of scrambled content. This option supports live ingests of channels such as nPVR, Catchup TV, and StartOver.

8. **Number of Unencrypted Packets** - Enabled once you select **Selective Encryption**. Open the list and select the number of clear packets.
9. **Partial/Random Encryption** - Enabled once you select **Selective Encryption**. Mark to select Partial/Random Encryption.
10. **Enhanced Hacking Prevention (EHP)** - Select to enable enhanced hacking prevention.
11. **ECMG Failure Protection** - Select to enable ECMG failure protection.

When selected, whenever the ECM is not received from at least one ECMG, the device continues scrambling TS packets of the relevant SCG(s) using the last 2 control words (toggling between them), with an increasing crypto-period number. For the failed ECMG, the last two ECMs are transmitted, for other ECMG(s) the new received ECMs are transmitted.

12. To configure CW synchronization, focus on the **CW Synchronization** section. This configuration applies to NMX control mode.

General

CAS Mode: DVB
CP Duration (Seconds): 15
Delay ECM Replacement (mSec): 0
CW Conformance: ☒
Set Bit 54 to 0: ☐
Selective Encryption: ☐
Enhanced Hacking Prevention (EHP): ☐
ECMG Failure Protection: ☐

CW Synchronization

Enable: ☒
Role: Init
Redundancy Peer IP Address: 0.0.0.0

13. **Enable** - Click to enable CW synchronization. When checked, the primary and backup device are CW synchronized.
14. In **Role**, select one of the following:
 - ☐ Init - Applies to NMX control mode only
 - ☐ Primary - This device functions as the primary device for CAS purposes
 - ☐ Backup - This device functions as the backup device for CAS purposes
 - ☐ Standalone - This device works in a standalone mode
15. In **Redundancy Peer IP Address**, enter the IP address of the backup CAS device.

Configuring EIS Parameters

The SCS-EIS page enables you to configure the EIS and ProStream communication.

To configure EIS parameters:

1. Log into the device as explained in [Logging into the Device](#).
2. Select **CA & BISS > SCS-EIS**.

The screenshot shows the SCS-EIS configuration page. The top section is titled 'General' and contains a 'TCP Port Number' field with the value '11000'. Below this is the 'EIS Routing Information' section, which contains a table with columns 'EIS #', 'Add Routing', 'IP Address', and 'Network Mask'.

EIS #	Add Routing	IP Address	Network Mask
1	<input type="checkbox"/>	0.0.0.0	255.255.255.0
2	<input type="checkbox"/>	0.0.0.0	255.255.255.0

3. Focus on the **General** section.
4. **TCP Port Number** - select the required value to set the TCP port through which ProStream communicates with the EIS. Valid values range between 1024 and 65535. The default value is 11000.



NOTE: ProStream 9100 is a server to the EIS device.

5. Focus on the **EIS Routing Information** to configure the EIS details.
6. In **EIS Data**, enter the IP address and subnet mask of EIS1 and EIS2 as explained below:
 - ☐ **Add Routing** - Select to enable the routing.
 - ☐ **IP Address** - Enter the IP address of EIS1 and EIS2.
 - ☐ **Network Mask** - Enter the subnet mask of EIS1 and EIS2, respectively, to enable communication when the EIS is hooked to a network other than the CAS or the management network.

Configuring ECMG Servers

To configure ECMG servers:

1. Log into the device as explained in [Logging into the Device](#).

2. Select **CA & BISS > ECMG**.

Name	Priority	Super CAS ID (Hex)	Protocol Revision	IP Address	Subnet Mask	Port	Channel ID	External CW	Status	# of Streams
Ecmg	1	10000	REV1	10.40.2.222	255.255.255.0	1	1	<input checked="" type="checkbox"/>	Disconnected	1
Ecmg	1	10000	REV1	10.40.2.244	255.255.255.0	1	1	<input checked="" type="checkbox"/>	Disconnected	1

3. In the **Channel Test Tolerance** list, select the required value to define the allowed channel-tests before closing the connection with the ECMG.

The default value is 3.

4. Click **Add**, to add an ECMG.

You may add up to 30 ECMGs.

5. Configure the ECMG according to the following parameters:

- ☐ Name - Type in a name for the ECMG.
- ☐ Priority - To allow redundancy, set priority by indicating the primary and secondary ECMG of the same SuperCAS ID.

The ProStream always tries to connect first to the ECMG with the same SuperCAS ID and the highest priority and then to the next highest priority. Assign priority from 1-10 with 1 as the highest priority.

- ☐ SuperCasID (hex) - A 32-bit identifier of the EIS provided by the CAS vendor.
- ☐ Protocol Revision - Specify the mode of operation of the ECMG. Select revision 1, 2 or 3.
- ☐ IP Address - Set the IP address of the ECMG. This IP address should be of the same subnet as the ETH2 IP address.
- ☐ Subnet Mask - Set subnet mask for the ECMG. In case ECMG resides in a subnet other than the management or CAS subnets, set ECMG Subnet Mask to allow communication.
- ☐ Port - Set in decimal, the number of the ECMG TCP port used to connect the ECMG to the ProStream. The CAS vendor provides this value.
- ☐ Channel ID - Set a unique number to define a unique ECMG.
- ☐ Ext. CW - When selected, an external CW is used. Select this option in case the ECMG generates a CW.
- ☐ Status - A read only filed which indicates the state of the connection. The connection state is either of the following:
 - ☐ Connected - ECMG and ProStream are communicating.
 - ☐ Disconnected - No connection is taking place at the moment.



TIP: Once you have set the CAS configuration and send configuration to the device, allocate the ECM PID.

- ☐ # of Streams - the number of streams that are open for the ECMG.

Setting EMMG Parameters

The Entitlement Management Message Generator issues EMMs (Entitlement Management Messages) that carry private Control Access (CA) information as access permits to specific users, access revocations etc. When configuring the EMMG, you set communication parameters to establish communication between the ProStream and the EMMG. The configuration is done through the EMMG page.

Configuring EMMG

You can add up to 30 EMMGs.

To configure an EMMG:

1. Select **CA & BISS > EMMG**.
2. To add an EMMG, click **Add**.

You can add up to 20 EMMGs.

3. Configure the EMMG by filling in the EMMG table:
 - ☐ Control TCP Port - Enter the TCP port via which the ProStream communicates with the EMMG. ProStream supports up to five ports.



NOTE: Do not use Port 5000 or 5001 for the EMMG port. These are reserved for ProStream internal use.

- ☐ Client/Super CAS ID (hex) - Enter in hex. an identifier of the EMMG. The EMMG vendor provides this number.
- ☐ Data Protocol - Specify whether the connection is TCP or UDP/broadcast. If you select UDP, the **Sect TS Packet** field is enabled and you should select the required option.
- ☐ IP Address - Type in the IP address of the EMMG.
- ☐ Subnet Mask - Enter the subnet mask of the EMMG to enable communication when the EMMG is hooked to a subnet other than the management or CAS subnets.
- ☐ Sect TS Packet - Enabled only if you select Broadcast under Control. The Sect TS Packet field defines the format of the EMM. The available formats are as follows:
 - ☐ Section - The EMM is in MPEG-2 section format.
 - ☐ Packet - The EMM is in MPEG-2 transport stream packet format.
- ☐ Data ID - Enabled only if you select Broadcast under Control. Type in the data source identifier.
- ☐ Data Format - Enabled only if you select Broadcast under Control. Allows to select either EMM or PDG data format.



TIP: Once you have configured the EMMG parameters, allocate EMM PIDs for the required TSs.

- ☐ Remove - Select the check box of the EMMG you wish to delete.

Allocating ECM PIDs

When allocating ECM PIDs you actually define PIDs as ECM PIDs. This procedure is performed via the **Configuration** page using the Injected ECM option.

For step-by-step instructions on how to allocate the ECM PID, see [Adding and Configuring ECM PIDs to the TS](#).

Allocating EMM PIDs

When allocating EMM PIDs you actually define PIDs as EMM PIDs. This procedure is performed via the **Configuration** screen and you can add an EMM in either of the following ways:

- Injected EMM PID - For step-by-step instructions on how to allocate the injected EMM PID, see [Configuring an Injected ECM PID](#).
- Passed EMM PID - For step-by-step instructions on how to allocate the EMM PID, see [Configuring a Passed ECM PID](#).

Internal EIS

ProStream 9100 is furnished with internal EIS and you can create, configure, and send SCGs to scramble the required service or PID. ProStream 9100 is able to provision up to 200 SCGs.

An SCG request applies to a service or a PID and each SCG should be unique. The following table lists the required combined parameters for creating a unique SCG:

Table 8–1: SCG Parameters

Data Type	SCG Components	Comments
Service	NID, TSID, SID, ECM ID	A single SCG can support multiple TSs,
PID	NID, TSIN, PID, ECM ID	

Using Internal EIS

Using the internal EIS comprises the following procedures:

- Define SCG components
- Associate an ECM with the SCG
- Send a provision

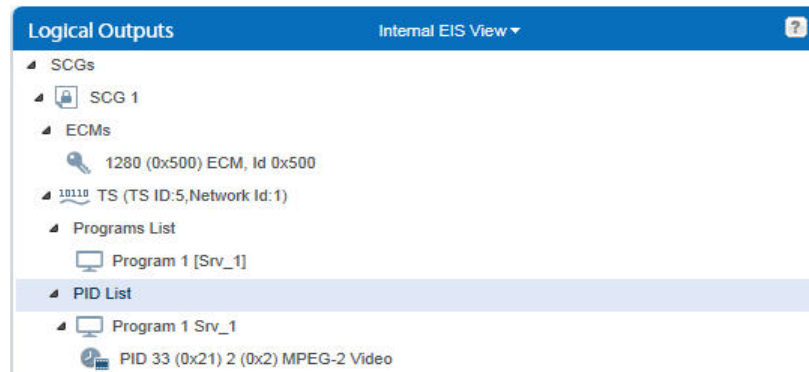
To use the internal EIS:

1. In Logical Output tool bar, open the drop-down menu and select **Internal EIS View**.

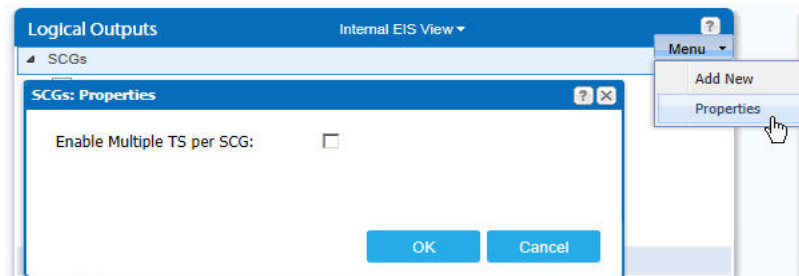


2. From the SCG drop-down menu, select **Add New**.
3. Configure the SCG as follows:
 - a. SCG - Select the required SCG ID.
 - b. Network - Select the required network.
 - c. TS ID - Select the required TS ID.
4. Click **OK**.

When you drill down the SCG, you can view the available ECMs and the configured TS. You can view the TS through its programs and PIDs.



5. To select multiple TSs, select the SCG container and from the drop-down list select **Properties**.



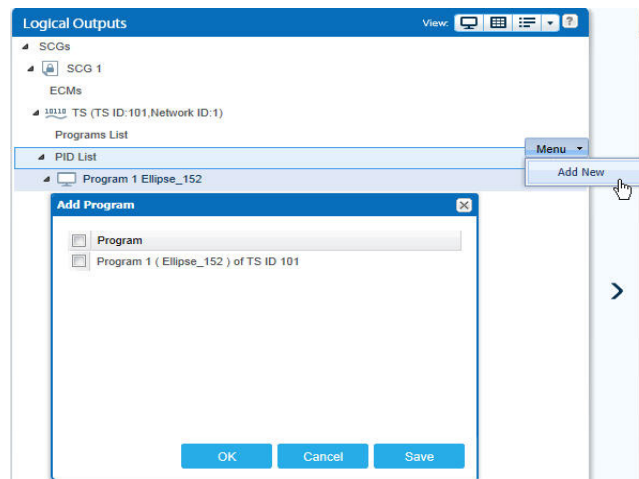
- ❑ **Enable Multiple TS per SCG** - Select this option to enable multiple TS.
- ❑ Click **OK**.

In this case the services/PIDs of the output TSs with the selected ID, regardless of their NID (Network ID) appear in the Component List.

6. To select the components to be scrambled, select either a program(s) from the Program List or PIDs.

To scramble a program:

1. Select the Program List container and from the drop-down menu select **Add New**.



2. Select the required program to be scrambled.

To scramble a PID:

1. Select the Program List container and from the drop-down menu select **Add New**.

The **Add PID** dialog box appears.

2. Select the required PID(s) to be scrambled.
3. Click **OK**.
4. To add ECMs, click **Add New** from the ECMs container.
You can add up to 30 ECMs per SCG.
5. To associate an ECM PID, select the required ECM and from the drop-down menu select **Properties**.
6. Configure the access criteria and view the ECM parameters.
7. To provision the SCG, click **Apply**.

Viewing Internal EIS**To view an internal EIS:**

1. Select **CS & BISS > SCG**.
2. To view SCG, focus on the SCG List and view the following:
 - ☐ SCG - SCG number
 - ☐ CP - The crypto period
 - ☐ Time to Next CP
 - ☐ TS ID
 - ☐ Program - The programs to be scrambled
 - ☐ PIDs - The PIDs to be scrambled
 - ☐ Activation Time - Shows the ID of the service(s)/PIDs to be scrambled by this SCG request.
 - ☐ Number of ECM Groups - The number of associated ECM groups.
 - ☐ EIS - Indicates whether internal EIS

- ❑ Configuration Match
 - ❑ State - Indicates whether OK or Failed
3. To view the ECMs, focus on ECMS and do the following:
 4. In Select SCG list, select the required SCG.
 5. View the following ECM information
 - ❑ ECM ID
 - ❑ Super CAS ID (Hex)
 - ❑ AC - Access criteria
 - ❑ Status - Indicates the ECM state

BISS Overview

Basic Interoperable Scrambling System (BISS) is an open standard for protecting digital contribution applications.

Digital contribution applications require the direct entry of a Session Word (SW) at the transmitter and receiver. The sender and receiver(s) of the transmission share the SW, and thus only the intended users receive the transmission. The Integrated Receiver Decoder (IRD) device can decode the content only if the SW is the same and complies with the BISS standard.

BISS supports the following modes of work:

- Mode 0 - No scrambling
- Mode 1 - Transmission is scrambled and a fixed clear SW is required for decoding.
- Mode E - Transmission is scrambled and a fixed encrypted SW is required for decoding.

BISS Specifications

Table 8–2: BISS Specifications

Specification	Explanation
ProStream 9100	In standalone mode only
Supported BISS mode	BISS Mode 1 Note: BISS-E mode is currently unsupported.
Supported Interfaces	Output ASI and GbE ports
Scrambling component	<ul style="list-style-type: none"> ■ Service level only ■ All ES components unless Always Clear is configured. See Applying BISS with Clear PID(s).
IRD	PVR-2900



NOTE: ProStream 9100 does not decode the transmitted streams. Decoding is performed by the specified IRD.

Configuring BISS



NOTE: BISS is applied on a service level only.

To configure BISS:

1. Open the web client of the device.
2. Select the **Symulcrypt Protocols** tab.

The screenshot shows two configuration tabs. The top tab, titled "General", contains the following settings: CAS Mode (DVB), CP Duration (Seconds) (15), Delay ECM Replacement (mSec) (0), CW Conformance (checked), Set Bit 54 to 0 (unchecked), Selective Encryption (unchecked), Enhanced Hacking Prevention (EHP) (unchecked), and ECMG Failure Protection (unchecked). The bottom tab, titled "CW Synchronization", contains the setting: Enable (unchecked).

3. Verify that in **CAS mode** DVB is selected.
4. In Logical Output, select the required program.
5. Select the **Scrambling** section.

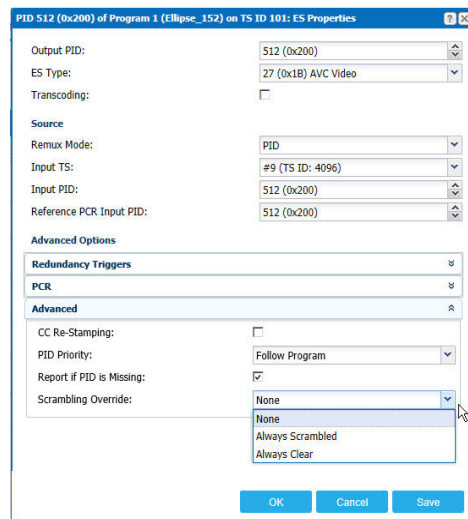
The screenshot shows the "Program 1 (Ellipse_152) of TS ID 101: Properties" dialog box. The "Advanced Options" section is expanded, showing the "Scrambling" section. The settings are: Program Name (Ellipse_152), Program Number (1), Priority (High), PMT PID (256 (0x100)), Service CBR (unchecked), and Bitrate (3). In the "Scrambling" section, CA Descriptor Location is set to Program Level, Enable BISS is checked, and Control Word (12 Hex chars) is 000000000000. Below the Scrambling section are expandable sections for Redundancy, PCR, Slate, EAS, Splicing DPI, ESAM, and Other. At the bottom are OK, Cancel, and Save buttons.

6. Select **Enable BISS**.
7. Enter the required Control Word with up to 12 hexadecimal characters (six bytes).
8. Click **OK**.

Applying BISS with Clear PID(s)**To apply BISS with clear PIDs:**

1. Select the **Configuration** page.

2. In Logical Output, select the required PID.
3. Click **Advanced**.



4. Open the **Scrambling Override** list and select the required option:
 - ❑ Per Service/Transport No Override - Follows the scrambling configuration of the TS or service
 - ❑ Always Scramble - Even if TS or service are not scrambled, the PID is scrambled as long as a fixed key or a CW is provided
 - ❑ Always Clear - Even if TS or service are scrambled, the PID is always clear.

CA

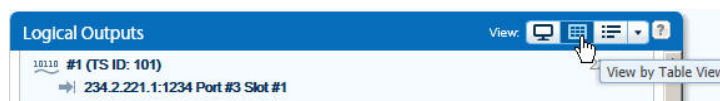
According to the BISS standard, a CA descriptor must be present in the PMT to support BISS. ProStream 9100 automatically adds a CA descriptor when BISS is enabled. You can add more descriptors if required.

CAT

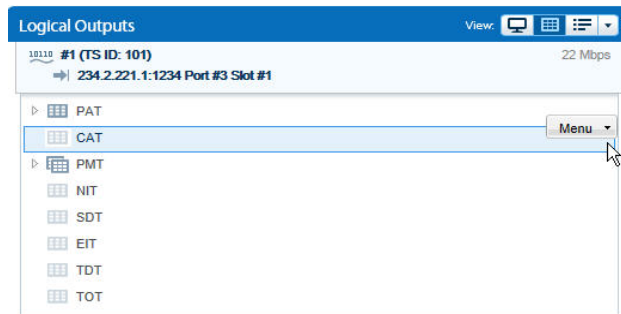
Verify that the Conditional Access Table (CAT) is enabled when BISS is enabled.

To enable CAT:

1. In Logical Output, switch to the Tables view.



2. Select the required TS and click to view its tables:

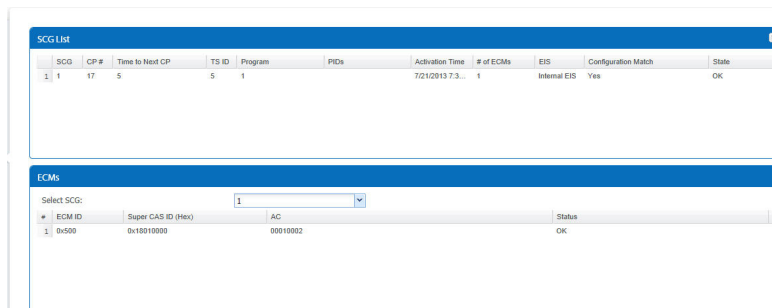


3. Select the **CAT** table.
4. If needed, configure it as explained in [Configuring CAT](#).

Viewing SCGs and ECMs

To view SCGs and ECMs:

1. Select **CA & BISS > SCGs**.



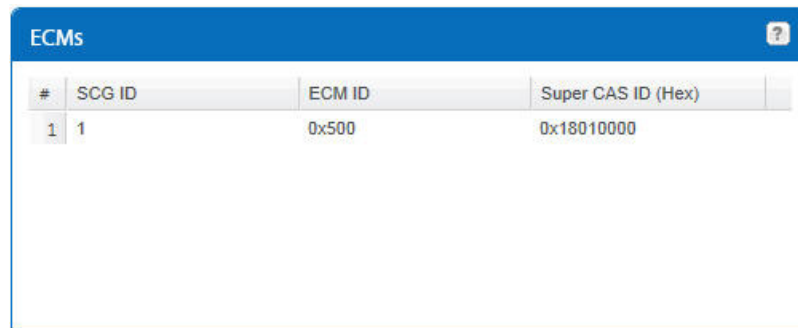
2. Focus on the **SCG List** and view the following parameters:
 - ❑ SCG ID - A unique identifier of the SCG
 - ❑ CP Number - A running counter of the number of Crypto Periods. It indicates the number of times the ECM has been changed for this stream.
 - ❑ Time to Next CP - Indicates how often the ECM is changing for this stream.
 - ❑ TS ID - The stream that carries the service to be encrypted as sent by the EIS.
 - ❑ Service - The ID of the program/service being scrambled using the specific SCG
 - ❑ PIDs - If PIDs are scrambled, indicates the scrambled PIDs
 - ❑ Activation Time - The activation time of this configuration
 - ❑ # ECMs - The number of associated ECMs
 - ❑ EIS - Whether internal or not
 - ❑ Configuration Match - Whether the SCG and ECM configuration is identical to the ECM PID allocation.
 - ❑ State - Whether scrambling is successful or not.
3. Focus on the ECM section.
4. Open the **Select SCG list** and select the required SCG from the list.

5. View the following parameters of the ECMs associated with the selected SCG:
 - ❑ ECM ID - A unique identifier of the ECM
 - ❑ Super CAS ID - A 32-bit identifier of the EIS provided by the CAS vendor.
 - ❑ AC - The access criteria associated with this ECM.
 - ❑ Status - Indicates the ECM status, whether OK or failed.

Viewing ECMs

To view available ECMs:

1. Select **CA & BISS > ECMs**.



#	SCG ID	ECM ID	Super CAS ID (Hex)
1	1	0x500	0x18010000

2. View the following ECMs parameters:
 - ❑ SCG ID - The SCG the ECM is associated with.
 - ❑ ECM ID - The ID of the ECM.
 - ❑ Super CAS ID (Hex) - Super CAS ID, a 32-bit identifier of the EIS provided by the CAS vendor.

Using a PSIG Device

When using a Program Specific Information Generator (PSIG) device, use the PSIG page. The PSIG interfaces with the ProStream device to receive information required for building the PSI tables and for injecting them to the ProStream 9100 device.

To work with PSIG:

1. Select **CAS & BISS > PSIG** page.
2. In **Controlled Via**, select the required enabled network to communicate with the PSIG. Select either Management or CAS.
3. In **Channel Test Retries**, enter the required retries for establishing communication with the PSIG.
4. Select **Enable** to enable the connection.
5. To add a PSIG, click **Add**.
6. Enter the following parameters:
 - ❑ TCP Port - Enter the TCP port number over which the ProStream device communicates with the PSIG.
 - ❑ Retries Interval (msec) - Enter the required testing interval.
 - ❑ IP Address - Enter the IP address of the PSIG.

- Subnet Mask - Enter the required subnet mask.

Chapter 9 Monitoring

In the event of a malfunction, the following events take place:

Table 9–1: Malfunction Reaction

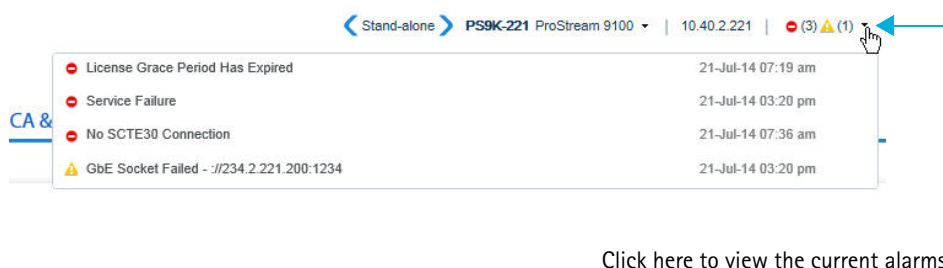
Object	Reaction
Front panel	The alarm LED is illuminated in red.
Web client	The alarm icon turns red. The number of active alarms is updated. a message appears notifying you of the nature of the problem.

Viewing Alarms

You may view the alarms via the **Alarms** page. This page also allows you to view the Alarm log and to save it as an XML file.

To view alarms:

- Do either of the following:
 - In the title bar, click the Alarms drop-down menu:



- In the web client, select **Alarms**.

The alarms are listed in reverse chronological order, with the first alarm in the list is the latest alarm to be registered. The **Active Alarm** page provides the following information.

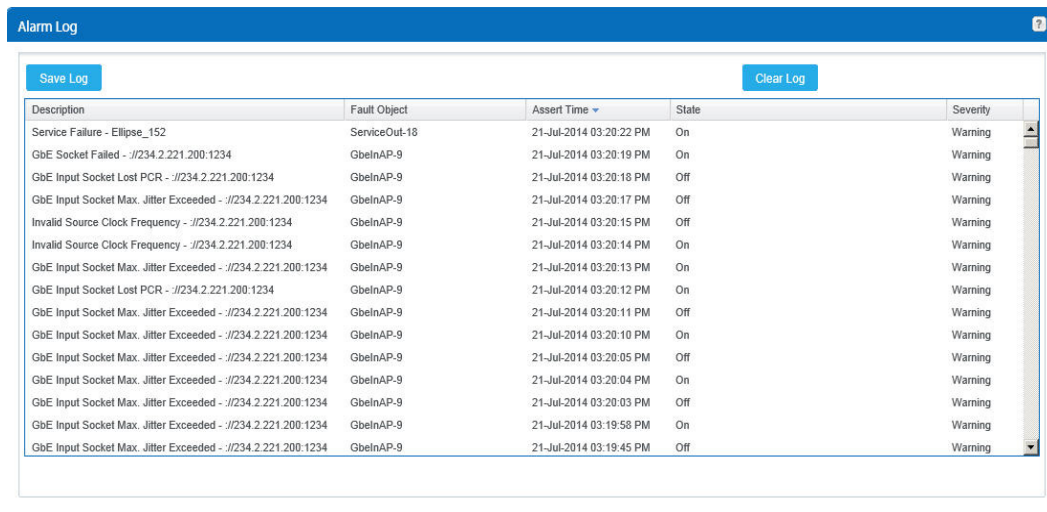
Parameter	Explanation
Description	Describes the fault that invoked the alarm
Fault Object	The faulty object that caused the alarm
Assert Time	Indicates the time the alarm was raised
Severity	The severity of the alarm: <ul style="list-style-type: none"> ■ Warning - 4 ■ Major - 5 ■ Critical - 6
Recovery Tip	Tips to remit the alarm

Alarms Log

The **Alarm Log** page displays in reverse chronological order the alarms that occurred up to the time you generated the log. To view an updated log, refresh the log. You may view, refresh, clear and save the log.

To view the alarm log:

- Select **Alarms > Alarm Log**.



Description	Fault Object	Assert Time	State	Severity
Service Failure - Ellipse_152	ServiceOut-18	21-Jul-2014 03:20:22 PM	On	Warning
GbE Socket Failed - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:20:19 PM	On	Warning
GbE Input Socket Lost PCR - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:20:18 PM	Off	Warning
GbE Input Socket Max. Jitter Exceeded - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:20:17 PM	Off	Warning
Invalid Source Clock Frequency - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:20:15 PM	Off	Warning
Invalid Source Clock Frequency - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:20:14 PM	On	Warning
GbE Input Socket Max. Jitter Exceeded - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:20:13 PM	On	Warning
GbE Input Socket Lost PCR - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:20:12 PM	On	Warning
GbE Input Socket Max. Jitter Exceeded - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:20:11 PM	Off	Warning
GbE Input Socket Max. Jitter Exceeded - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:20:10 PM	On	Warning
GbE Input Socket Max. Jitter Exceeded - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:20:05 PM	Off	Warning
GbE Input Socket Max. Jitter Exceeded - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:20:04 PM	On	Warning
GbE Input Socket Max. Jitter Exceeded - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:20:03 PM	Off	Warning
GbE Input Socket Max. Jitter Exceeded - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:19:58 PM	On	Warning
GbE Input Socket Max. Jitter Exceeded - //234.2.221.200:1234	GbelnAP-9	21-Jul-2014 03:19:45 PM	Off	Warning

The log displays the alarms registered up to the time you generated the log and informs you of the following:

Parameter	Explanation
Description	Describes the fault that invoked the alarm
Faulty Object	The faulty component
Assert Time	Indicates the time the alarm was raised
State	Indicates whether the alarm is on or off
Severity	The severity of the alarm

To clear the log:

- In the **Alarm Log** page, click **Clear Log**.

The currently displayed log disappears. When you click **Refresh History**, a new log is generated. It includes alarms registered since the last clear log.

To save the log to a file:

1. In the Alarm screen, click **Save Log**.
2. Select a location for saving the file and click **Save**.

The log is saved as an XML file in the location of your choice.

Chapter 10

Troubleshooting

Troubleshooting

The following table lists the alarm messages and describes their probable cause and possible solutions. The alarms are arranged according to its source object.

Table 10–1: Alarm List Raised by Platform

ID	Alarm Message	Description	Solution
4	CPC Card Temp. Sense Exceed Limits	The card is overheating.	<ul style="list-style-type: none">■ Check for proper operation of the cooling fans.■ Power-off the device.■ Ensure that the air filters are clean.■ If alarm persists, call Customer Support.
5	CPC Card Voltage Error	Inappropriate power supply for CPC card.	Power-off the device and Call Customer Support.
6	CPC Card HW Failure	An essential component of the card is faulty.	Power-off the device and Call Customer Support
7	Platform Initializing	Indicative alarm that appears in History log only.	N/A
11	NTP Connection Failure	Connection to NTP failed or lost	<ul style="list-style-type: none">■ Check Ethernet link of Ethernet port 3.■ Check NTP server definitions.
16	Front Panel Not Present	Front panel malfunction	Call Customer Support.
17	Failure Generating CW	The CWS (Control Word Server) does not successfully generate CW.	Power down and power up the CWS.
18	Multiple NMX Connected - IP Address 1, IP Address 2	More than one NMX is controlling the device.	Use only one NMX to control the device.
19	Got New Configuration	Indicative alarm that appears in History log only. Indicates a change in the configuration.	N/A
20	Platform Change to be Backup	Indicative alarm that the unit configuration has changed and currently it is configured as a backup device	N/A

Table 10–1: Alarm List Raised by Platform

ID	Alarm Message	Description	Solution
21	Platform Change to be Primary	Indicative alarm that the unit configuration has changed and currently it is configured as a primary device	N/A
22	DT Mux Priority Changed	Indicative alarm remitted when a redundancy switch has taken place. Thus, the DT mux priority was changed.	N/A
24	Auto-Negotiation Failed: management network	The handshake protocol with the switch failed	Reconfigure the switch to use auto-negotiation settings.
25	Auto-Negotiation Failed: CAS network	The handshake protocol with the switch failed	Reconfigure the switch to use auto-negotiation settings.
26	Could not Reserve Max Splice Engines	The device could not reserve maximum splice engines to splice services.	Check how many spliceable services were configured and remove unnecessary services
31	Reset Required after Successful DL	The required firmware is ready. Reset the device to bootup with the new firmware.	Reset the device.
32	Background Download in Progress	Background download in progress	N/A
33	Background Download in Progress - Retry	Indicative alarm. Background Download is in Progress.	N/A
34	Background Download Failed - TFTP Error	Background download failed due to TFTP error.	Check that the TFTP server is up and running. Zap the device.
35	Background Download Failed - Disk Full	Background download failed because the disk is full.	Remove previous firmware files to free up space.
36	Background Download Failed - Error	Background download failed.	Check that the TFTP server is up and running. Zap the device.
37	Background Download Canceled	Background Download was cancelled	Reboot the device or retry to download firmware.

Table 10–1: Alarm List Raised by Platform

ID	Alarm Message	Description	Solution
38	Reserved BR in Safe Mode	At least one of the DiviTrack pools was configured to enable the reservation of pool bitrate. When this is true, the Multiplexer expects the reserved bitrate client to communicate with it at least once every 5 seconds. This term was not fulfilled, so the actual reserved bitrate for every DiviTrack pool will be the maximum configured bitrate.	Contact Harmonic Customer Support.
65	Unavailable Internal Socket	The internal socket created for the insertion channel is not allocated.	If problem persists, call customer support.
70	License Grace Period Enabled	A licensed feature has been used without a license. You have a grace period of 45 days to use this feature and to purchase a license	Purchase the license for the feature
71	License Expired	License has reached its expiration date.	Purchase the required license
73	License General Failure	An internal licensing failure is detected	<ul style="list-style-type: none"> Restart the device If problem persists, call Customer Support.
80	SFC Detection Failed	Failed to detect System Fan Controller due to: HW failure of the controller, or Controller is not installed.	Replace fan unit
81	Cooling System Failure	Detected at least one faulty fan out of 6 or x of 8 fans	Replace fan unit
82	SFC Cooling Communication Failure	A transient error indication.	Verify the alarm is remitted. If persists, replace fan unit.
83	SFC Ext Temp Near Threshold	Internal temperature \geq Internal temperature threshold	To be defined
84	SFC Amb Temp Near Threshold	External temperature \geq external temperature threshold.	To be defined
85	PSU1 Not Mounted	Power supply is not mounted in slot 1	Insert Power supply module in slot 1
86	PSU2 Not Mounted	Power supply is not mounted in slot 2	Insert Power supply module in slot 2

Table 10-1: Alarm List Raised by Platform

ID	Alarm Message	Description	Solution
87	PS1 Not Operational	Power supply in slot 1 is malfunctioning	<ul style="list-style-type: none"> ■ Check power ■ Check power cable ■ Check power supply unit in slot 1
88	PS2 Not Operational	Power supply in slot 2 is malfunctioning	<ul style="list-style-type: none"> ■ Check power ■ Check power cable ■ Check power supply unit in slot 1
89	IPOL Card Temp. Sense Exceeds Limits	IPOL card is over heating	<ul style="list-style-type: none"> ■ Check the fans for proper operation ■ Check the temp of the environment.
90	SW Upgrade Failed		
112	Syslog Server is Unreachable	There is not communication between the Splicer and the Syslog server	Check connectivity
113	Ad Server Communication Error		
114	CMG Protection Activated		
115	CMG System is Slowing Down		

Table 10-2: Alarm List Raised by Slot

ID	Alarm Message	Description	Solution
11	Card Missing	The configured card is not detected in the slot.	<ul style="list-style-type: none"> ■ Verify that the card is mounted in the slot. ■ Verify that the card is secured to the slot. ■ If problem persists, replace card.
12	Card Mismatch	The detected card is not as configured	Verify that the appropriate card is mounted in the slot.

Table 10-3: Alarm List Raised by ASI Scr Card

ID	Alarm Message	Description	Solution
4	ASI Sensed Temp Exceeds Limits	The card is overheating.	<ul style="list-style-type: none"> ■ Check for proper operation of the cooling fans. ■ Power-off the device. ■ Ensure that the air filters are clean. ■ If alarm persists, replace the IOM card.
5	ASI Card Voltage Error	Inappropriate power supply of GbE card.	Replace card. If more than one card issues the alarm, call Customer Support.
6	ASI Card HW Failure	An essential component of the card is faulty.	Replace card.
7	ASI Card Initializing	An essential card error.	Replace card.

Table 10-4: Alarm List Raised by 8VSB Card

ID	Alarm Message	Description	Solution
7	Meteor Card Initializing	An essential card error.	Replace card.
6	Meteor Card HW Failure	An essential component of the card is faulty.	Replace card.
4	Meteor Sensed Temp. Exceeds Limits	The card is overheating.	<ul style="list-style-type: none"> ■ Check for proper operation of the cooling fans. ■ Power-off the device. ■ Ensure that the air filters are clean. ■ If alarm persists, replace the card.
5	Meteor Card Voltage Error	Inappropriate power supply of GbE card.	Replace card. If more than one card issues the alarm, call Customer Support.

Table 10-5: Alarm Raised by ASI Port

ID	Alarm Message	Description	Solution
11	ASI Input Signal Loss	No ASI input flow.	<ul style="list-style-type: none"> ■ Check the ASI source. ■ check the ASI input cable and replace if defective.

Table 10–5: Alarm Raised by ASI Port

ID	Alarm Message	Description	Solution
12	ASI Input Sync Loss	No valid MPEG data detected on the input ASI signal	Check the ASI source.
15	ASI Output Bitrate Unsynchronized		

Table 10–6: Alarm List Raised by 8VSB Port

ID	Alarm Message	Description	Solution
	Meteor Demodulator Reset	No RF input is detected	Check RF input

Table 10–7: Alarm List Raised by Transcoding Card

ID	Alarm Message	Description	Solution
7	Transcoding Card Initializing	Indicative alarm that appears in History log only.	N/A
6	Transcoding Card Failure	The transcoding card crashed resulting from an unknown error.	Call Customer Support
21	Transcoding Card is Not Supported by HW Model	The device RAM is less than 1G.	Call Customer Support
4	Transcoding Card Temp. Sense Exceed Limits	The card is over heating	Call Customer Support
5	Transcoding Card Voltage Error	Inappropriate power supply of transcoding card.	Call Customer Support
12	ACE Card Buffer Overflow		

Table 10-8: Alarm List Raised by the Transcoding Engine

ID	Alarm Message	Description	Solution
17	No Communication with TransEngine	The main processing unit cannot communicate with the transcoding engine	Verify that the transcoding card is securely fastened in its slot If persists, call customer support
11	TransEngine FPGA Signal Loss	Transcoding engine internal fault	Call Customer Support
12	TransEngine FPGA Sync Loss	Transcoding engine internal fault	Call Customer Support
16	TransEngine FPGA Output Overflow	Transcoding engine internal fault	Call Customer Support
20	Loss of Input TS (no nulls)	Transcoding engine internal fault	Call Customer Support
21	TransEngine Application Error (no output)	Transcoding engine internal fault	Call Customer Support
23	Host-TransEngine Sync Error (Time Change)	Transcoding engine internal fault	Call Customer Support
24	TS RX Overflow Error	Transcoding engine internal fault	Call Customer Support
25	TS TX Underflow Error	Transcoding engine internal fault	Call Customer Support
27	Audio DSP - Communication Failure	Transcoding engine internal fault	Call Customer Support
28	Audio DSP - Core Failure	Transcoding engine internal fault	Call Customer Support
29	Audio DSP - System Failure	Transcoding engine internal fault	Internal problem. If problem persists, call Customer Support.
30	Audio DSP - Not enough resources	Transcoding engine internal fault	Check that configuration meets spec.

Table 10-9: Alarm List Raised by GbE-1G Card

ID	Alarm Message	Description	Solution
4	GbE Card Sensed Temp Exceeds Limits	The card is overheating.	<ul style="list-style-type: none"> ■ Check for proper operation of the cooling fans. ■ Power-off the device. ■ Ensure that the air filters are clean. ■ If alarm persists, replace the IOM card.
6	GbE Card HW Failure	An essential component of the card is faulty.	Replace card.
7	GbE Card Initializing	An essential card error.	Replace card.
5	GbE Card Voltage Error	Inappropriate power supply of GbE card.	Replace card. If more than one card issues the alarm, call Customer Support.
11	GbE Output Multicast Buffer Overflow	Too many identical PIDs are output through the same IOM card.	Reduce the number of multicast PIDs.
13	GbE Input Descrambling Bitrate Exceeded	The input traffic buffer overflowed.	Check the input bit rate.
8	GbE Card Input Data Loss	An internal data error in the GbE IOM card.	Reassign the GbE IOM.
12	Pacer Clock Error	An internal error in the GbE IOM card.	Reassign the GbE IOM.
14	GbE Flash Upgrade in Process	A notification message during the upgrade of the GbE IOM firmware.	N/A

Table 10-10: Alarm List Raised by GbE-4G Card

ID	Alarm Message	Description	Solution
4	GbE -4G Card Sensed Temp Exceeds Limits	The card is overheating.	<ul style="list-style-type: none"> ■ Check for proper operation of the cooling fans. ■ Power-off the device. ■ Ensure that the air filters are clean. ■ If alarm persists, replace the IOM card.
6	GbE-4G Card HW Failure	An essential component of the card is faulty.	Replace card.

Table 10-10: Alarm List Raised by GbE-4G Card

ID	Alarm Message	Description	Solution
7	GbE-4G Card Initializing	An essential card error.	Replace card.
5	GbE-4G Card Voltage Error	Inappropriate power supply of GbE card.	Replace card. If more than one card issues the alarm, call Customer Support.
11	GbE Output Multicast Buffer Overflow	Too many identical PIDs are output through the same IOM card.	Reduce the number of multicast PIDs.
13	GbE Input Descrambling Bitrate Exceeded	The input traffic buffer overflowed.	Check the input bit rate.
8	GbE-4 Card Input Data Loss	An internal data error in the GbE IOM card.	Reassign the GbE IOM.
12	Pacer Clock Error	An internal error in the GbE IOM card.	Reassign the GbE IOM.
14	GbE-4G Flash Upgrade in Process	A notification message during the upgrade of the GbE IOM firmware.	N/A
21	GbE-4G Protobuf Server is Not Connected		
200 300 1	Packets Without 47 in TS header		

Table 10-11: Alarm Raised by GbE Port

ID	Alarm Message	Description	Solution
17	GbE Auto-Negotiation Failed	the handshake protocol with the switch failed	Check switch.

Table 10–11: Alarm Raised by GbE Port

ID	Alarm Message	Description	Solution
23	GbE Input Error	Input GbE port general failure.	<ul style="list-style-type: none"> ■ Verify that an SFP is installed in the port. ■ Check the physical connection between the port and the switch. ■ Check the validity of the GbE port configuration and that it matches the network definitions.
16	GbE Input IP Packet CRC Error	At least one IP packet has a CRC error.	Check the switch, fiber and SFP connections.
24	GbE Input IP Packet CRC Error	At least one IP packet is missing.	Check the switch, fiber and SFP connections.
20	GbE Input Non MPEG Buffer Overflow	Management traffic on the GbE network port exceeds the port's capacity.	Looks for sources with excessive management traffic.
21	GbE Input Inter Packet Gap Too Small	The Inter Packet Gap is below 12 ticks.	Check source.
22	GbE Input Invalid IP/UDP Packet Length	The payload length of an input IP/UDP packet is not divisible by 188 bytes (standard length of an MPEG packet).	Check source.
11	GbE Link Down - Cable Disconnect	The Gigabit Ethernet port is down.	Connect the cable.
26	GbE Port Failed	The GbE port link is down.	Check the link for connectivity.
15	GbE Output MPEG Buffer Overflow	FIFO overrun causes data to be dropped and might cause decoding problems.	Standalone - reset the module. If it does not remit the alarm, contact Harmonic Customer Support.
12	GbE SFP Missing	The SFP connector is missing from the GbE port.	Check that the SFP connector is fully inserted.
25	GbE Slave Channel Activated	In port redundancy, the backup port is active.	None.
200 600 1	GbE=4 Port Input Data Loss		

Table 10–11: Alarm Raised by GbE Port

ID	Alarm Message	Description	Solution
200 601 2	GbE-4G Port Exceeds Max. 800 Mbps.		
200 601 3	GbE-4G Port Exceeds Max. Input.		

Table 10–12: Alarm List Raised by GbE in Access Point

ID	Alarm Message	Description	Solution
41	GbE Input Backup Socket Not Active	No data is detected in the backup input socket	Verify the socket is correctly defined and is streamed to the device.
42	GbE Input Primary Socket Not Active	No data is detected in the primary input socket	Verify the socket is correctly defined and is streamed to the device.
21	GbE Input Socket Buffer Overflow	Input bit rate exceeds estimated bit rate	Check source
22	Invalid Source Clock Frequency	Source clock frequency breaches the MPEG specifications	Check source
24	GbE Input Socket Lost PCR	For more than 100ms, no PCR has been detected at input socket	Check source
25	GbE Input Socket Erred PCR	PCR discontinuity with no Discontinuity indicator	Check source
26	GbE Input Socket CBR Rate Changed	Detects a change in the bit rate of an MPTS. The MPTS must be a CBR stream.	Check source
27	GbE Input Socket Max. Jitter Exceeded	An MPTS socket is not CBR	Check source
28	GbE Input Socket Timestamp Error	The order of the transport stream packets inside the IP packet is wrong.	In most cases, this is a momentary alarm. If this alarm is not remitted, check the network.

Table 10-12: Alarm List Raised by GbE in Access Point

ID	Alarm Message	Description	Solution
31	Failed to Receive CW for the Service	The descrambler does not successfully receive a CW response for the service from the CWS (Control Word Server).	Check that the CWS is alive and communication cables are connected.
32	Invalid Response from CWS	There are problems in communication between the descrambler and CWS.	Check that the CWS is alive and communication cables are connected.
33	Missing ECM	No ECM was extracted from PMT for the scrambled service.	The scrambler does not send ECM to the descrambler. Check scrambler configuration.
34	Missing CA Information	There is no CA information for the descrambled service.	The CA descriptor is missing. Check the scrambler configuration.
35	Undefined Scrambling Algorithm	There is no AES descriptor in the PMT.	The descrambler still will try to descramble the service. The scrambler should add a CAS Mode descriptor to the PMT.
37	Unsupported Scrambling Algorithm	The scrambling descriptor is not AES-NSA.	In this case, the descrambler will try to descramble the service. The scrambler should add a scrambling descriptor with an AES-NSA value to the PMT.
38	Encoder's Clock Not Synced to Mux	The clock of the encoder is not synchronized with the clock of the multiplexer.	Check the schedule format against the specification.
52	GbE Input Primary Socket- PAT Missing	PAT is missing in the primary socket for a longer period than the configured failover time	Check source
53	GbE Input Backup Socket- PAT Missing	PAT is missing in the backup socket for a longer period than the configured failover time	Check source
54	Missing PMT		
55	Missing Backup PMT		
50	GbE Backup Socket Activated	With access point/socket level redundancy configured, the primary transport has failed, and the backup transport is active or failed.	None
43	Queue Depth Threshold Passed	The allocated buffer reaches the predefined fullness (50%)	Check bit rate configuration in the input data socket

Table 10-12: Alarm List Raised by GbE in Access Point

ID	Alarm Message	Description	Solution
	GbE Input Primary Socket - A/V Missing	With access point/socket/ service- level redundancy configured, the primary transport failed. GbE Input Backup Socket - A/V Missing	<ol style="list-style-type: none"> 1. Check the GbE input for link and activity. 2. Check that the IP and UDP are flowing to the port. 3. Check that the IP and UDP do not create a conflict with other sockets (same 32 lower bits).
	GbE Input Backup Socket - A/V Missing	With access point/socket/ service- level redundancy configured, the primary transport failed.	<ol style="list-style-type: none"> 1. Check the GbE input for link and activity. 2. Check that the IP and UDP are flowing to the port. 3. Check that the IP and UDP do not create a conflict with other sockets (same 32 lower bits).
47	DiviTrack Upstream Problem	Connectivity problem between the DiviTrack controller and the encoder.	Check the connectivity between the device and the encoder.
46	DiviTrack Downstream Problem	Connectivity problem between the encoder and the DiviTrack controller.	Check the connectivity between the device and the encoder.
11	GbE Socket Failed	With access point/socket/ service- level redundancy configured, both the primary and the backup transports have failed.	<ol style="list-style-type: none"> 1. Check that the IP and UDP are indeed flowing to the port. 2. Check that the IP and UDP do not create a conflict with other sockets (same 32 lower bits).
15	PSIP Tables Missing	PSIP Master Guide Table (MGT) was lost.	Recheck the connection and extraction settings.

Table 10-13: Alarm Raised by 8VSB in Access Point

ID	Alarm Message	Description	Solution
21	Meteor Weak Signal/Loss of Sync	No RF input is detected	Check RF input

Table 10-13: Alarm Raised by 8VSB in Access Point

ID	Alarm Message	Description	Solution
25	Meteor Packet Error Rate Threshold Exceeded	Problematic RF signal.	Check support Meteor page to get the actual instantaneous packet error rate value.
23	Meteor Signal Quality (SNR) Below Threshold	Problematic RF signal.	Check support Meteor page to get the actual signal quality value.

Table 10-14: Alarm Raised by GbE Out Access Point

ID	Alarm Message	Description	Solution
12	GbE Output Socket Not Transmitted	Cannot get MAC address of the destination in unicast mode.	Check IP connectivity to destination.
13	GbE Output Socket - Unreachable Destination	Cannot get an updated destination MAC address. Output is sent to the last known MAC address. (in unicast mode)	Check IP connectivity to destination.
16	GbE Output Socket - Buffer Overflow Level = High	The actual bit rate of the GbE output socket exceeds the configured output bit rate	Delete services from the alarmed TS until the bit rate stabilizes and the alarm is remitted or redefine bit rate for this socket.
17	GbE Output Socket - Buffer Overflow Level = Normal	Because of PID priority, some PIDs from Normal priority are dropped.	Informational only.
18	GbE Output Socket - Buffer Overflow Level = Medium	Because of PID priority, some PIDs from Medium priority are dropped.	Informational only
19	GbE Output Socket - Buffer Overflow Level = Low	Because of PID priority, some PIDs from Low priority are dropped.	Informational only.
20	Invalid CAS Mode	An invalid CAS mode is detected	Set the correct CAS mode
11	DVB Regen. Not Supported by this HW Model	DVB Regenerations Not Supported	This HW model does not support this feature.

Table 10-15: Alarm Raised by Tsln

Alarm Message	Description	Solution
CC Error Detected	The splicer detected a continuity counter error on the transport stream input.	None
MPEG Sync Loss	The port has lost sync with the incoming transport.	Check source
Invalid CAS mode	The CAS mode for fixed key should be AES_CBC for both descrambler and scrambler	Change the CAS mode and reset the device
Primary Source Failed	The primary source failed and redundancy switch took place	Check source
Backup Source 1 Failed	Backup source 1 failed	Check source
Backup Source 2 Failed	Backup source 2 failed	Check source
Backup Source 3 Failed	Backup source 3 failed	Check source
Backup Source 4 Failed	Backup source 4 failed	Check source
Backup Source 5 Failed	Backup source 5 failed	Check source
Primary Source PID Underflow	Average bitrate of the primary source in the pre-defined bitrate window is under the pre-defined threshold	Check source
Backup Source 1 PID Underflow	Average bitrate of the backup source 2 in the pre-defined bitrate window is under the pre-defined threshold	Check source
Backup Source 2 PID Underflow	Average bitrate of the backup source 2 in the pre-defined bitrate window is under the pre-defined threshold	Check source
Backup Source 3 PID Underflow	Average bitrate of the backup source 3 source in the pre-defined bitrate window is under the pre-defined threshold	Check source

Table 10-15: Alarm Raised by Tsln

Alarm Message	Description	Solution
Backup Source 4 PID Underflow	Average bitrate of the backup source 4 in the pre-defined bitrate window is under the pre-defined threshold	Check source
Backup Source 5 PID Underflow	Average bitrate of the backup source 5 source in the pre-defined bitrate window is under the pre-defined threshold	Check source
Primary Source PAT Missing	PAT is missing in primary	Check source
Backup Source 1 PAT Missing	PAT is missing in backup source 1	Check source
Backup Source 2 PAT Missing	PAT is missing in backup source 1	Check source
Backup Source 3 PAT Missing	PAT is missing in backup source 1	Check source
Backup Source 4 PAT Missing	PAT is missing in backup source 1	Check source
Backup Source 5 PAT Missing	PAT is missing in backup source 1	Check source
Primary Source PMT Missing	PMT is missing in primary	Check source
Backup Source 1 PAT Missing	PAT is missing in backup source 1	Check source
Backup Source 2 PMT Missing	PMT is missing in backup source 1	Check source
Backup Source 3 PMT Missing	PMT is missing in backup source 1	Check source
Backup Source 4 PMT Missing	PMT is missing in backup source 1	Check source
Backup Source 5 PMT Missing	PMT is missing in backup source 1	Check source
Primary Source CC Errors Detected	The number of detected continuity counter errors in a pre-configured time exceeds the pre-defined number of allowed CC errors on the primary source.	Check source

Table 10-15: Alarm Raised by Tsln

Alarm Message	Description	Solution
Backup Source 1 CC Errors Detected	The number of detected continuity counter errors in a pre-configured time exceeds the pre-defined number of allowed CC errors on backup source 1.	Check source
Backup Source 2 CC Errors Detected	The number of detected continuity counter errors in a pre-configured time exceeds the pre-defined number of allowed CC errors on backup source 2.	Check source
Backup Source 3 CC Errors Detected	The number of detected continuity counter errors in a pre-configured time exceeds the pre-defined number of allowed CC errors on backup source 3.	Check source
Backup Source 4 CC Errors Detected	The number of detected continuity counter errors in a pre-configured time exceeds the pre-defined number of allowed CC errors on backup source 4.	Check source
Backup Source 5 CC Errors Detected	The number of detected continuity counter errors in a pre-configured time exceeds the pre-defined number of allowed CC errors on backup source 5.	Check source
Primary Source Detected Scrambled PID	Detected a scrambled PID on primary source.	Check source
Backup Source 1 Detected Scrambled PID	Detected a scrambled PID on backup source 1.	Check source
Backup Source 2 Detected Scrambled PID	Detected a scrambled PID on backup source 2.	Check source
Backup Source 3 Detected Scrambled PID	Detected a scrambled PID on backup source 3.	Check source
Backup Source 4 Detected Scrambled PID	Detected a scrambled PID on backup source 4.	Check source
Backup Source 5 Detected Scrambled PID	Detected a scrambled PID on backup source 5.	Check source

Table 10-15: Alarm Raised by Tsln

Alarm Message	Description	Solution
TS Protection Activated	A TS protection redundancy switch took place.	Check source
Could Not Find a Proper Backup Source	All backup sources are faulty.	Check source
Primary Video Source PID Underflow	There is a PID underflow in the primary video source in Socket # - PID #.	Check the arrival bitrate on the Video PIDs and missing Video PIDs on the primary source.
Primary Data Source PID Underflow	There is a PID underflow in the primary data source in Socket # - PID #.	Check the arrival bitrate on the Data PIDs and missing Data PIDs on the primary source.
Primary Audio Source PID Underflow	There is a PID underflow in the primary audio source in Socket # - PID #.	Check the arrival bitrate on the Audio PIDs and missing Audio PIDs on the primary source.
Backup Video Source 5 PID Underflow	There is a PID underflow in the backup video source 5 in Socket # - PID #.	Check the arrival bitrate on the Video PIDs and missing Video PIDs on the backup source 5.
Backup Video Source 4 PID Underflow	There is a PID underflow in the backup video source 4 in Socket # - PID #.	Check the arrival bitrate on the Video PIDs and missing Video PIDs on the backup source 4.
Backup Video Source 3 PID Underflow	There is a PID underflow in the backup video source 3 in Socket # - PID #.	Check the arrival bitrate on the Video PIDs and missing Video PIDs on the backup source 3.
Backup Video Source 2 PID Underflow	There is a PID underflow in the backup video source 2 in Socket # - PID #.	Check the arrival bitrate on the Video PIDs and missing Video PIDs on the backup source 2.
Backup Video Source 1 PID Underflow	There is a PID underflow in the backup video source 1 in Socket # - PID #.	Check the arrival bitrate on the Video PIDs and missing Video PIDs on the backup source 1.
Backup Data Source 5 PID Underflow	There is a PID underflow in the backup data source 5 in Socket # - PID #.	Check the arrival bitrate on the Data PIDs and missing Data PIDs on the backup source 5.
Backup Data Source 4 PID Underflow	There is a PID underflow in the backup data source 4 in Socket # - PID #.	Check the arrival bitrate on the Data PIDs and missing Data PIDs on the backup source 4.
Backup Data Source 3 PID Underflow	There is a PID underflow in the backup data source 3 in Socket # - PID #.	Check the arrival bitrate on the Data PIDs and missing Data PIDs on the backup source 3.
Backup Data Source 2 PID Underflow	There is a PID underflow in the backup data source 2 in Socket # - PID #.	Check the arrival bitrate on the Data PIDs and missing Data PIDs on the backup source 2.

Table 10-15: Alarm Raised by TslN

Alarm Message	Description	Solution
Backup Data Source 1 PID Underflow	There is a PID underflow in the backup data source 1 in Socket # - PID #.	Check the arrival bitrate on the Data PIDs and missing Data PIDs on the backup source 1.
Backup Audio Source 5 PID Underflow	There is a PID underflow in the backup audio source 5 in Socket # - PID #.	Check the arrival bitrate on the Audio PIDs and missing Audio PIDs on the backup source 5.
Backup Audio Source 4 PID Underflow	There is a PID underflow in the backup audio source 4 in Socket # - PID #.	Check the arrival bitrate on the Audio PIDs and missing Audio PIDs on the backup source 4.
Backup Audio Source 3 PID Underflow	There is a PID underflow in the backup audio source 3 in Socket # - PID #.	Check the arrival bitrate on the Audio PIDs and missing Audio PIDs on the backup source 3.
Backup Audio Source 2 PID Underflow	There is a PID underflow in the backup audio source 2 in Socket # - PID #.	Check the arrival bitrate on the Audio PIDs and missing Audio PIDs on the backup source 2.
Backup Audio Source 1 PID Underflow	There is a PID underflow in the backup audio source 1 in Socket # - PID #.	Check the arrival bitrate on the Audio PIDs and missing Audio PIDs on the backup source 1.
GbE Input Primary Video - PID Underflow	There is a PID underflow in the GbE input primary video in Socket # - PID #.	Check the arrival bitrate on the Video PIDs and missing Video PIDs on the primary source.
GbE Input Primary Data - PID Underflow	There is a PID underflow in the GbE input primary data in Socket # - PID #.	Check the arrival bitrate on the Data PIDs and missing Data PIDs on the primary source.
GbE Input Primary Audio - PID Underflow	There is a PID underflow in the GbE input primary audio in Socket # - PID #.	Check the arrival bitrate on the Audio PIDs and missing Audio PIDs on the primary source.
GbE Input Backup Video - PID Underflow	There is a PID underflow in the GbE input backup video in Socket # - PID #.	Check the arrival bitrate on the Video PIDs and missing Video PIDs on the backup source.
GbE Input Backup Data - PID Underflow	There is a PID underflow in the GbE input backup data in Socket # - PID #.	Check the arrival bitrate on the Data PIDs and missing Data PIDs on the backup source.
GbE Input Backup Audio - PID Underflow	There is a PID underflow in the GbE input backup audio in Socket # - PID #.	Check the arrival bitrate on the Audio PIDs and missing Audio PIDs on the backup source.

Table 10-16: Alarm Raised by ECM PID Allocation

ID	Alarm Message	Description	Solution
11	ECM Stream Error	This alarm is related to the ECMG machine. Cannot get ECM from ECMG.	<ol style="list-style-type: none"> 1. Check ECMG logs. 2. Check AC. 3. Check the error number, reported from ECMG.
12	ECM Spooling Error	There is a failure in ECM spooling.	The total number of spooled tables should not exceed 128 tables per transport stream.
11	EMM PID Missing	The configured EMM is missing	<ul style="list-style-type: none"> ■ Check EMM configuration ■ Check connectivity between device and EMMG.
12	EMM Bitrate Exceeded	The bit-rate of the EMM is higher than the configured bit-rate	Check EMM configuration

Table 10-17: Alarm Raised by CAS

ID	Alarm Message	Description	Solution
11	SCS EIS Not Connected	The TCP connection with the EIS client on port 11000 is not established.	Ensure the following: <ul style="list-style-type: none"> ■ The TCP link with EIS (ping) exists. ■ The EIS configuration is 11000.
12	ECM is Missing in Configuration	One or more ECMs in one or more SCG messages are missing, or the device receives an SCG message with an unknown ECM ID.	Add an ECM and update as necessary to ensure that all ECMs in SCG messages are present in the ECM configuration.
13	PID to Scramble is Missing in Config	One of the PIDs that suppose to be scrambled isn't configured in the output.	Verify output configuration and EIS SCG provisioning.
15	SCS ECMG Connection Failure	The ECMG connection has been disconnected for 10 seconds. Services may not be encrypted properly.	Check the ECMG properties, the Ethernet network, and the ECMG.
16	SCS ECMG Communication Problem	The ECMG connection has been disconnected for 10 seconds. Services may not be encrypted properly.	Check the ECMG properties, the Ethernet network, and the ECMG.

Table 10-17: Alarm Raised by CAS

ID	Alarm Message	Description	Solution
17	SCS CP Less than Delay Start	The Crypto Period is less than the delay start.	Adjust the Crypto Period or Delay Start property values so that the crypto period is greater than the delay start value.
18	Backup is Not Connected		

Table 10-18: Alarm Raised by Reference Service

Alarm Message	Description	Solution
Remap Range Overflow	The number of PIDs of the Reference Service exceeds the configured number	Increase the configured remap range.
Input Service Missing	The PMT of the Reference Service is missing	Check source
Input RSS PID Missing	At least one PID is missing in the Reference Service	Check source

Table 10-19: Alarm Raised by Output Stream

Alarm Message	Description	Solution
PID Missing	Provisioned PID is missing in the input	Check source.
Unsupported Chroma Sampling Mode	The input video stream is not 4:2:0.	Do not attempt to re-encode video streams of chroma sampling mode other than 4:2:0.
Low Delay Video Stream Detected	The input video stream is low-delay and cannot be re-encoded.	Do not attempt to re-encode low-delay content.
HD Stream Detected	The video stream is HD and cannot be re-encoded.	Do not attempt to re-encode HD streams.
Unsupported Frame Rate	The input video stream is not NTSC.	Do not attempt to re-encode non-NTSC video.
Unsupported Resolution	The input video stream horizontal resolution is not supported.	Do not attempt to re-encode a video stream with a horizontal resolution that is not 480, 528, 544, 704, or 720.

Table 10-19: Alarm Raised by Output Stream

Alarm Message	Description	Solution
Encrypted PID	The input stream is encrypted and cannot be re-encoded.	Do not attempt to re-encode encrypted content.
No DTS/PTS Detected at Input	No DTS/PTS was detected at input for 700 ms. The input video stream is not MPEG compliant.	Check the input stream.
Invalid DTS at Input	The input video stream is not MPEG compliant.	Check the input stream.
Sequence Header Error	The input video stream is not MPEG compliant.	Check the input stream
Picture Header Error	The input video stream includes an invalid picture header or bad marker bits. The input video stream is not MPEG-compliant.	Check input stream.
Video Macro Block Level Error	A problem was encountered in decoding the slice and macro blocks.	Check the source.
MPEG1 Stream Detected	The video stream is MPEG1 and cannot be re-encoded.	Do not attempt to re-encode MPEG1 streams.
Progressive Refresh Stream Detected	A progressive refresh video stream was detected in a re-encoded service. Re-encoded services do not support progressive refresh streams.	Remove the progressive refresh stream from the re-encoded service.
Field Pictures Detected	Field pictures were detected. Field picture streams are not supported in re-encoded services.	Remove field picture stream from the re-encoded service.
Unexpected Frame Rate (Video Standard)	The input video stream is not MPEG compliant.	Check the input stream
Unable to Decode Input Stream	The device cannot decode the input stream.	Check the input stream.
Corrupt Input TS	The input transport stream is corrupted.	Check the input stream.
Processing Input PID Missing	Internal error in transcoding engine	Call customer support
Wrong Video Standard (MPEG2/H264)	This input video format is not supported in this version.	Check input

Table 10-19: Alarm Raised by Output Stream

Alarm Message	Description	Solution
Input Vertical Resolution Mismatch	The configured VR does not match the actual VR	Check input
Vertical Resolution Changed on Input	A notification because it is service affecting. While transcoding the input VR type changed.	Engine is resetting and transcodes with new resolution.
Invalid Picture Type (not I, P or B)	Applies to input video format H264. It is a stream related failure while decoding the stream.	Check input
Reference PCR PID Interval Error	Did not get reference PCR for > 500 ms. Either the PID does not contain PCR values or it is missing.	Check the source.
PIP Configured but PIP Mode is Disabled	PIP Configured but PIP Mode is Disabled	
PID Recoding Failure	Invalid content for reencoding.	Check source
PID Xcoding Failure	Invalid content for transcoding	Check source
Input Codec Not Supported	The input video type is different than 2, x80 and x1B.	Change the input type (should not require removal and re-creating the stream)
Output Codec Not Supported	The output codec is not supported	Change the output
SD Transcoding Not Supported	When trying to transcode a SD stream.	Check configuration
Audio - Cannot decode - Corrupted input	Invalid content for decoding.	Check input source. If problem persists, call Customer Support.
Audio - Decoder Failure	The device cannot decode the input stream due to either input source or stream configuration.	Check input source and stream configuration. If problem persists, call Customer Support.
Audio - Encrypted PID detected	Cannot decode an encrypted PID.	Check input source.
Audio - No input/ Unable to sync	No input stream is detected	Check input source.
Audio - No PES detected	No audio frames are detected in the input stream.	Check input source.

Table 10-19: Alarm Raised by Output Stream

Alarm Message	Description	Solution
Audio - Input Audio Mode Higher than Config	Inconsistency between actual input audio mode and configured audio mode. For example, actual is MC and configured is ST.	Check Input Coding Mode configuration.
Audio - Decoding Format Mismatch Config.	The input decoding format is set to a low MHz decoder (AAC LC / AC3) but actually decoding format is a high MHz (AAC HE / E-AC3).	In the Audio Transcoding tab, configure decoding format to Any .
Audio - Encoder Failure	The device cannot encode the input stream due to either input source or stream configuration.	Internal problem. If problem persists, call Customer Support.
Audio - Unsupported Output Bitrate	The configured output bitrate is not supported for the configured coding mode.	Check that bitrate configuration is supported for configured Output Coding Mode. See Table 5–15.
Audio - Unsupported Output Coding Mode	The configured output coding mode is not supported.	Check configuration. Try changing <i>Follow</i> to another value.
Audio - Unsupported Output Sample Rate	Output sample rate is always as in the input.	Check configuration
Audio - Cannot Meet PCR Insertion Rate	PCR insertion rate is too low.	Increase the audio ES bitrate
Audio - Encoder Detects PTS Gap	No PTS was detected at input for xxx ms. The input video stream is not MPEG compliant.	Check input source.

Table 10-20: Alarm Raised by Output Services

Alarm Message	Description	Solution
Backup Service 1 is Activated	Backup service1 is activated	Informational alarm only. Look for another alarm that triggered the backup service.
Backup Service 2 is Activated	Backup service 2 is activated	Informational alarm only. Look for another alarm that triggered the backup service.
Backup Service 3 is Activated	Backup service is 3 activated	Informational alarm only. Look for another alarm that triggered the backup service.
Service Failure	Service is not streamed out	Check source

Table 10-20: Alarm Raised by Output Services

Alarm Message	Description	Solution
Recoding Unit Failure	The recoding unit crashed resulting from an unknown error, or the input video stream is not MPEG compliant.	Check the input stream
Input PCR Interval Error	Interval error > 100 ms.	Informational only.
Corrupt Input PCR	The device detects more than one time base discontinuity within one second.	
PCR on Unsupported Component	The input PCR is not carried on the video component.	Informational alarm.
Too Many ES	The input service includes a number of non video elementary streams beyond the device's re-encoding capabilities. The maximum number of ES on the ProStream 9100 is 6.	Do not attempt to re-encode content with more than one video and five non video elementary streams.
Could not Allocate Recoding Unit	The device could not allocate a re-encoder to re-encode this service. There were no free units to re-encode the program.	Check how many re-encoded services (VBR, Caped VBR, and DTMX pools) were configured and remove unnecessary services.
Excessive Non-Video Rate	The allocated video rate is less than 2 Mbps.	Monitor the service to check its behavior. If problem persists, call Customer Support.
I-Frame Dropped	Due to errors in the input, the capped GOP structure was violated, and an I-frame was dropped.	Check the input stream.
ReEncoded Service Required Video ES	There is no video ES for the re-encoded service.	Verify that a video PID is provisioned on the service.
ReEncoded Service Rate Too Low	In DiviTrackMX, the rate is too low for encoding.	N/A
EAS is Activated	EAS service is activated.	None
EAS Input Service Missing	The associated EAS input service is missing.	Check the EAS input transport to ensure that the associated EAS input service exists.
Passthrough Service Exceeded Max Rate	Input bit rate of the Passthrough Service is higher than Max Bit Rate. Service output will be muted.	Check input signal.

Table 10-20: Alarm Raised by Output Services

Alarm Message	Description	Solution
Slate Service is Activated	Occurs when the Slate feature is activated.	None
Slate Service Failure	Occurs on the service output when the Slate is missing from the service input (even when the Slate is not activated).	The stream cannot flow end-to-end. Check input stream.
Primary Service Failure	The primary/backup source failed.	The stream cannot flow end-to-end. Check input stream.
Backup Service 1 Failure	The stream cannot flow end-to-end.	Check input stream.
Backup Service 2 Failure	The stream cannot flow end-to-end.	Check input stream.
Backup Service 3 Failure	The stream cannot flow end-to-end.	Check input stream.
Service Name SCTE30 Error	In splicing, another spliceable service with the same name is detected	Check configuration
Exceeded Spliceable ESs Capacity	In splicing, too many PIDs are associated with the service. The maximum PIDs are: Up to one video, up two audio, up to eight data PIDs	Check configuration to match spec
No SCTE30 connection	In splicing, Ad-Server either did not send Init request or Init request is wrong.	Check Ad-Server configuration
Insertion Channel is Missing	Insertion channel (ad) did not arrive on time.	Check Ad-Server streaming interface.
Input PMT Missing	PMT entry required on the output was not received on the input.	Recheck the extraction settings on the service provided as the tables' input for the PSIP/DVB regeneration.
Input VCT Missing	VCT entry required on the output was not received on the input.	Recheck the extraction settings on the service provided as the tables' input for the PSIP regeneration.
ReEncoded Service Missed Rate	DiviTrackMX, internal fault	If alarm persists, call Customer Support
Transcoding Unit Failure	The transcoding unit crashed resulting from an unknown error, or the input video stream is not MPEG compliant.	Check the input stream.

Table 10-20: Alarm Raised by Output Services

Alarm Message	Description	Solution
Could not Allocate Transcoding Unit	Too many services to transcode. Cannot allocate trans engine	Check configuration
Reenc and Trans are selected for the Service	Wrong configuration	Check configuration either to reencode or to trans
Service Name SCTE30 Error	Another Splice enabled service with the same name is provisioned	Change to a unique service name
Exceeding No. of PIDs per Splice Service	Check the max. number of PIDs per Splice enabled service.	Max. number of PIDs per Splice enabled service is: <ul style="list-style-type: none"> ■ 1 Video PID ■ Up to 8 Audio PIDs ■ Up to 4 Data PIDs

Table 10-21: Alarm Raised by Service Outputs

Alarm Message	Description	Solution
Insertion Channel is Missing	Splicer could not receive the Ad at the insertion channel for a certain Splice event.	Check connection with the Ad server (video network)
Splice Event Failed. Session ID #	Splicer could not play the Ad and had to return to the network feed	Check that ad streams are provisioned and that they are valid
Splicing License Missing	Exceeded the number of installed DPI licenses.	Install additional DPI licenses or reduce number of splice enabled services
Could Not Allocate Splice Engine	Splicer could not allocate a Splice Engine for the service.	Check that the GbE 4G card is installed properly
Splice Enabled Service Must Have 1 Video PID	A Splice enabled service supports only one video PID	Verify that the input service has only one video PID

Table 10-22: Alarm Raised by Lack of License

Alarm Message	Description	Solution
License Transcoding Missing	No license for transcoding and Grace period has expired.	Purchase the required license

Table 10-22: Alarm Raised by Lack of License

Alarm Message	Description	Solution
License PIP Missing	No license for PIP and Grace period has expired.	Purchase the required license
License Audio Level Missing	No license for ALM and Grace period has expired.	Purchase the required license
License Pool Missing	No license for pool and grace period has expired.	Purchase the required license

Chapter 11

Spreadsheet

The Spreadsheet page shows sections of the transport streams found on the Configuration page. These include:

- Input Sockets
- Input Transports
- Output Sockets
- Output Transports

Configuration DiviTrack Alarms Administration Platform CA & BISS Multiscreen **Spreadsheet**

Input Sockets

Input Transports

Output Sockets

Output Transports

#	Action	Slot : Port	IP Address	TCP/UDP Port	Logical Connection	Socket Description	IP Type
1	None	S1:P1	233.0.1.1	2000	Primary of #1 (TS ID 1)		Multicast
2	None	S1:P1	227.124.5.1	2000	Primary of #2 (TS ID 2)		Multicast

Bulk processing of sockets or streams on any Spreadsheet page can be done in one of two ways:

- Select the stream sockets or streams required. The filters on spreadsheet columns can be used to make this process easier.
- Make a change on any one of the selected items. All selected items will reflect the same change. This includes the **Remove** button in the bottom left corner. Click **Remove** to delete all selected streams.



NOTE: To ensure best spreadsheet performance while processing more than 100 sockets, filter them first, then sort.

Input Sockets

The Input Sockets sheet accesses information found in the Physical Inputs section of the Configuration page. You can display, sort, and manipulate information by means of drop-down menus.

To work with Input Sockets:

1. Click **Input Sockets** in the left column of the Spreadsheet page.
2. Select the box for the Input Socket required, or select the top box in the left column for all sockets.
3. In the **Action** column, select the line required.

4. Select one of the following actions:
 - ☐ None
 - ☐ Open Dialog - To view the Input Socket Properties dialog.
For further information, see [Configuring a Socket](#).
 - ☐ Tree View - To see the socket in the Configuration page.
 - ☐ Duplicate - To make copies of the socket with new logical transport streams for the copies. Here you can:
 - ☐ Set the number of copies
 - ☐ Select/clear Increment IP Address
 - ☐ Select/clear Increment Port Number
5. Use the drop-down menu on the right side of each column to enable the following:
 - ☐ Sort Ascending
 - ☐ Sort Descending
 - ☐ Columns: Two options are available.
 - ☐ Select/clear a check box to select/deselect the column view
 - ☐ Filter by Subject.

For filtering options, see the following table.

 - ☐ Filter

	Show All	General	FEC	SSM	De-Jittering
Slot: Port	√	√	√	√	√
IP Address	√	√	√	√	√
IP Version	√	√	√	√	√
TCP/UDP Port	√	√	√	√	√
Logical Connection	√	√	√	√	√
Socket Description	√	√	√	√	√
IP Type	√	√			√
Encapsulation Mode	√	√	√		√
SSM-1IP	√			√	
SSSM-2 IP	√			√	
SSM-3 IP	√			√	
SSM-4 IP	√			√	
FEC	√		√		
De-Jittering Mode	√				√

	Show All	General	FEC	SSM	De-Jittering
Delay (ms)	√				√
Average Input Bitrate (Mbps)	√				√

6. Click on the following columns to configure them:

- ☐ IP Address
- ☐ IP Version
- ☐ TCP/UDP Port
- ☐ Socket Description
- ☐ IP Type
- ☐ Encapsulation Mode
- ☐ SSM-1 IP
- ☐ SSM-2 IP
- ☐ SSM-3 IP
- ☐ SSM-4 IP
- ☐ De-Jittering Mode
- ☐ Delay (ms)
- ☐ Average Input Bitrate (Mbps)

	Show All	General	FEC	SSM	De-Jittering
Slot: Port	√	√	√	√	√
IP Address	√	√	√	√	√
IP Version	√	√	√	√	√
TCP/UDP Port	√	√	√	√	√
Logical Connection	√	√	√	√	√
Socket Description	√	√	√	√	√
IP Type	√	√			√
Encapsulation Mode	√	√	√		√
SSM-1IP	√			√	
SSSM-2 IP	√			√	
SSM-3 IP	√			√	
SSM-4 IP	√			√	
FEC	√		√		

	Show All	General	FEC	SSM	De-Jittering
De-Jittering Mode	√				√
Delay (ms)	√				√
Average Input Bitrate (Mbps)	√				√

Input Transports

The Input Transports sheet accesses information found in the Logical Inputs section of the Configuration page. The information can be displayed, sorted, and manipulated by means of drop-down menus.

To work with Input Transports:

1. Select **Input Transports** in the left column of the Spreadsheet page.
2. Select the Input Transport required, or select the top box in the left column for all transports.
3. In the **Action** column, select the line required. Select the appropriate action:
 - ☐ None
 - ☐ Open Dialog to see the Input TS: Properties box.
For further information, see [TS Properties](#).
 - ☐ Tree View to see the transport stream in the Configuration page.
4. Unless otherwise noted, all columns have a drop-down menu on the right side of the column. This menu enables access to the following:
 - ☐ Sort Ascending
 - ☐ Sort Descending
 - ☐ Columns: two options are available.
 - ☐ Select/clear a box to select/deselect the column view
 - ☐ Filter by Subject:
 - ☐ TS ID
 - ☐ Description
 - ☐ Primary Source
 - ☐ Report CC Errors Alarm
 - ☐ Eligible for Slate
 - ☐ Bitrate (Mbps)
 - ☐ Padding (Mbps)
 - ☐ Effective Rate (Mbps)
 - ☐ Transport Errors
 - ☐ Number of Errors
 - ☐ Filters
5. Click on the following columns to configure them:
 - ☐ Description - Free text

- ☐ Report CC Errors Alarm - Always, Never, If PID is Passed
- ☐ Eligible for Slate - Select/clear the check box

Output Sockets

The Output Sockets sheet accesses information found in the Physical Outputs section of the Configuration page. The information can be displayed, sorted, and manipulated by means of drop-down menus.

To work with Output Sockets:

1. Select **Output Sockets** in the left column of the Spreadsheet page.
2. Select the box for the Output Socket required, or the top box in the left column for all sockets.
3. In the **Action** column, select the line required. Select the appropriate action:
 - ☐ None
 - ☐ Open Dialog, to see the Output Socket Properties dialog.
For further information, see [Configuring the Output Socket - GbE Output Port Only](#).
 - ☐ Tree View, to see the transport stream in the Configuration page.
 - ☐ Duplicate, to make copies of the socket with new logical transport streams for the copies. Increment the IP Address and Port Number by checking the boxes provided. Click OK to create the new sockets.
4. Unless otherwise noted, all columns have a drop-down menu on the right side of the column. This menu enables the following:
 - ☐ Sort Ascending
 - ☐ Sort Descending
 - ☐ Columns: two options are available.
 - ☐ Select/clear a check box to select/deselect the column view
 - ☐ Filter by Subject: for filter options, see [Table 11-1](#)
 - ☐ Filters
5. Click on the following columns to configure them:
 - ☐ IP Address
 - ☐ IP Version
 - ☐ UDP Port
 - ☐ Socket Description
 - ☐ Encapsulation Mode
 - ☐ IP Type
 - ☐ Bitrate
 - ☐ Bitrate (Mbps)
 - ☐ FEC Enable
 - ☐ Static Destination MAC (checkbox)
 - ☐ Static Destination MAC (address)
 - ☐ IP Packet Size
 - ☐ Time to Live

- ❑ Source IP Type
- ❑ Source IP Address

Table 11–1: Filter Options

	Show All	General	FEC	Source	QoS	Bitrate	VLAN Tagging
Slot: Port	√	√	√	√	√	√	√
IP Address	√	√	√	√	√	√	√
IP Version	√	√	√	√	√	√	√
UDP Port	√	√	√	√	√	√	√
Logical Connection	√	√	√	√	√	√	√
Socket Description	√	√	√	√	√	√	√
Encapsulation Mode	√	√	√	√	√	√	
IP Type	√	√		√	√	√	
Bitrate	√					√	
Bitrate (Mbps)	√					√	
FEC Enable	√		√				
Number of Columns	√		√				
Number of Rows	√		√				
Static Destination MAC	√						
IP Packet Size (Bytes)	√						
Time to Live	√						
Source IP Type	√			√			
Source IP Address	√			√			
Source UDP Port	√			√			

Table 11–1: Filter Options

	Show All	General	FEC	Source	QoS	Bitrate	VLAN Tagging
Flow Label ¹	√						
Traffic Class ¹	√						
Hop Limit ¹	√						
QoS Type	√				√		
TOS Value (8 bits)	√				√		
Precedence	√				√		
Type of Service	√				√		
VLAN Tagging Mode	√						√
VLAN Identifier	√						√
Drop Eligible Indicator	√						√
Priority Code Point	√						√

¹ Configurable in IVPv6 mode only

Output Transports

The Output Transports sheet accesses transport-related information found in the Logical Outputs section of the Configuration page. The information can be displayed, sorted, and manipulated by means of drop-down menus.

To work with Output Transports:

1. Select **Output Transports** in the left column of the Spreadsheet page.
2. Select the box for the Output Transport required, or the top box in the left column for all transports.
3. In the **Action** column, click on the line required. Select the appropriate action:
 - ☐ None
 - ☐ Open Dialog, to open the Output TS: Properties box.
For further information, see [Configuring Output TS Properties](#).
 - ☐ Tree View, to see the transport stream in the Configuration page.

-
4. Unless otherwise noted, all columns have a drop-down menu on the right side of the column. This menu enables the following:
 - ☐ Sort Ascending
 - ☐ Sort Descending
 - ☐ Columns: two options are available.
 - ☐ Select/clear a box to select/deselect the column view
 - ☐ Filter by Subject
 - ☐ TS ID
 - ☐ TS Description
 - ☐ Network ID
 - ☐ Scrambling Mode
 - ☐ Scrambling Key
 - ☐ Bitrate
 - ☐ Filters
 5. Click on the following columns to configure them:
 - ☐ TS Description
 - ☐ Scrambling Mode
 - ☐ Scrambling Key



NOTE: Press **Apply** to have all changes entered take effect.

Chapter 12

Administration and Platform Parameters

Overview

The Administration, Platform, and Spreadsheet pages include additional features as well as ways to configure a ProStream. These features are grouped as follows:

Administration Page:

- IGMP - Select the required IGMP version. See [Selecting IGMP Version](#).
- NTP and Time - Set the time of the device. See [Setting Device Time](#).
- Password - Define an access level. See [Setting a Password](#).
- HW Clock Source - Set the hardware clock source. See [Defining HW Clock Source](#).
- DPI - Define the SCTE30 Port and allocate resources. See [Defining the SCTE30 Port and Allocating Resources](#).
- A/V Processing - Define the following:
 - Set-top-box mode. See [Defining the Set-Top-Box](#).
 - ACE Video Configuration - Enable PIP and to set the video frequency. See [Transcoding a PIP Service](#).
 - ACE Audio Configuration - Define silence insertion. See [Defining ACE Audio Configuration](#).
- SNMP - See [Defining SNMP Parameters](#)
- BDS - For future use
- VIS - See [Video Inventory System \(VIS\)](#).
- Licenses - See [Licenses](#).
- Assets - For uploading of logo insertion files. See [Uploading Logo Insertion Files](#).
- Remote Servers
 - Syslog - See [Syslog Settings](#).
 - DNS server - See [DNS](#).

Platform Page:

- Redundancy - See [Device Redundancy](#)
- EAS - Configure Emergency Alert System. See [Defining SNMP Parameters](#).
- ESAM - Configure ESAM system. See [ESAM \(Event Signaling and Management\)](#).

Selecting IGMP Version

IGMP-v3 enables you to reuse multicast addresses in a network. Multicast streams in an IGMP-v3 enabled network are identified not only by their destination address, but also by their source address.

ProStream 9100 may operate either in IGMP-v2 or IGMP-v3 mode. Switching between modes is service affecting.

To select IGMP Version:

1. Select **Administration > Global Setting**.



The screenshot shows the 'General' settings tab. The 'Device Name' field contains 'PS9K-221'. The 'IGMP' dropdown menu is set to 'IGMPv2'.

2. Open the list and select the required mode:

- ☐ Auto Detect
- ☐ IGMP Version 2
- ☐ IGMP Version 3

Setting Device Time

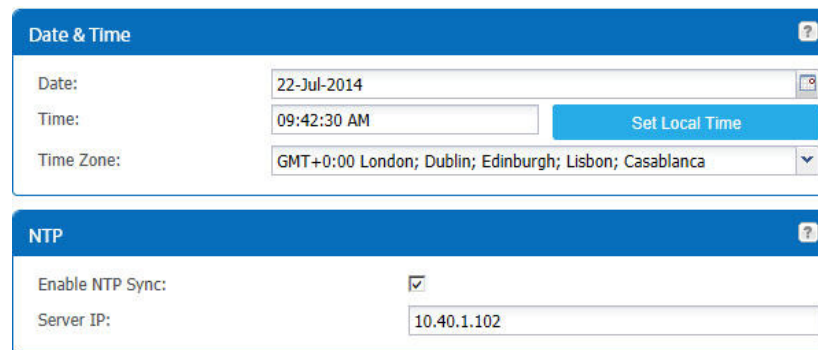
Network Time Protocol (NTP)

The Network Time Protocol table enables you to synchronize the device time with Universal Time Coordination (UTC) by connecting the device to an NTP server. If you enable this option, you cannot set the time of the unit manually.

To set ProStream time according to the NTP server:

Once you set the time according to the NTP server, you cannot set ProStream time manually.

1. In the web page, select **Administration > Date & Time**.



The screenshot shows two sections of the web interface. The top section, 'Date & Time', has fields for 'Date' (22-Jul-2014), 'Time' (09:42:30 AM), and 'Time Zone' (GMT+0:00 London; Dublin; Edinburgh; Lisbon; Casablanca). There is a 'Set Local Time' button. The bottom section, 'NTP', has a checkbox for 'Enable NTP Sync' which is checked, and a 'Server IP' field containing '10.40.1.102'.

2. To synchronize the ProStream time with UTC, check **Enable NTP Sync**.
3. In **Server IP**, enter the IP address of the NTP server.

If an NTP server is unavailable, you can set the unit time manually.

Setting Device Time Manually

To set the device time manually:

1. In the **Date** and **Time** fields, enter date and time respectively.
Date format: dd/month/yyyy. Time format: hh:mm:ss AM/PM.
2. To send required date and time to the unit, click **Set Local Time**.

A verification message appears.

3. Click **OK**.

The required time is sent to the unit and the date and time are updated immediately.

4. To set the local time offset from Greenwich Mean Time (GMT), open the **Time Zone** list and select the required GMT offset.



NOTE: Set manually local time offset upon Day Light Saving changes.

Setting a Password

- Select **Administration > User Management**. See [Changing a Password](#).

Defining HW Clock Source



NOTE: SFN application is currently unsupported.

In SFN application, the Receiver accepts an external clock signal over an ASI port 1 of any card.

To define the HW clock source:

1. In the web page, select **Administration > Global Settings > Advanced** section.

The screenshot shows the 'Advanced' settings window. It has a blue header with the title 'Advanced' and a help icon. Below the header, there are two settings: 'HW Clock Source' with a dropdown menu currently showing 'Internal', and 'Service Descriptors Automatic Generation' with a checked checkbox.

2. Under **HW Clock Source**, select the required option:
 - ☐ Internal - To revert to the internal clock
 - ☐ Slot 1- Slot 5 - Select the required slot for receiving the external clock.
3. **Service Descriptors Automatic Generation** - select to allow automatic generation of service-name descriptor in SDT table.

Defining the Audio/Video Processing

Defining the Set-Top-Box

To configure Set-Top-Box:

1. Select **Administration > Global Settings > Video Processing** section.

The screenshot shows the 'Video Processing' settings window. It has a blue header with the title 'Video Processing' and a help icon. Below the header, there are four settings: 'Set-Top Box Mode' with a dropdown menu showing 'DVB', 'ACE Picture in Picture (PiP)' with an unchecked checkbox, 'Video Frequency(Hz)' with a dropdown menu showing '60', and 'PS2K Compatible' with an unchecked checkbox.

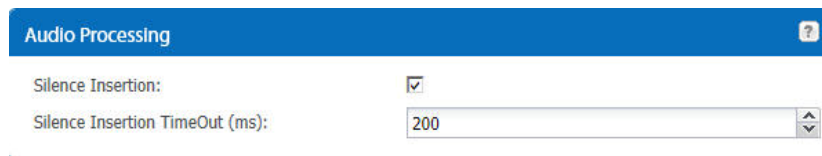
2. Open the **Set-Top Box Mode** list and select one of the following:

- ☐ DVB
 - ☐ Motorola
 - ☐ Phillips
 - ☐ Samsung SMT (gives an 8:9 aspect ratio for video headers of transcoded H.264 720x480i output)
3. To enable ACE video processing, select **ACE Picture in Picture (PIP)**. See [Transcoding a PIP Service](#).
 4. To set the video frequency, open the Video Frequency list and select 50Hz or 60Hz.
 5. PS2K Compatible - select to enable compatibility with ProStream 2000.

Defining ACE Audio Configuration

To configure ACE audio:

1. Select **Administration > Global Settings > Video Processing** section.



2. Open the **Silence Insertion Enable** list and select either of the following:
 - ☐ Enable - full support of Silence Mode. If enabled, silence is inserted in cases of corrupt/missing audio input.
 - ☐ Disable
3. In **Silence Insertion Timeout (msec)** - enter the required time out. The default is 200 milliseconds. This determines the input loss period required before silence insertion activates.

Defining SNMP Parameters

The device is capable of reporting its status via SNMP (Simple Network Management Protocol) to third-party SNMP-based network management systems.

The status of the device is reported to the SNMP manager as SNMP Traps - notifications that the device initiates and sends to the SNMP manager to indicate the assertion or remittance of an alarm or warning. SNMP Traps are sent only to SNMP managers that are registered with the device. To enable sending SNMP traps, configure up to four SNMP managers.

To forward SNMP traps:

1. Select **Administration > SNMP** page.

IP Address	UDP Port	Community Name	Description
10.40.2.22	162	public	

Upload MIB Files to the PC

2. IP Address - Enter the IP address of the computer to which you want to forward all SNMP traps from the device.
3. UDP port - Select the UDP the device uses for connecting and sending traps.
4. Community Name - Enter the required string value for the Get Community.
The Get Community is the community with Read access to the network elements. The elements will respond to this community's Get commands. The default string is public.
5. Description - Enter a short description of the Trap Listener.
6. To add another device to receive the traps, click **Add**.

Video Inventory System (VIS)

As services traverse the network, multicast addresses change due to local service aggregation and ad splicing. Since the operator cannot correlate a multicast address to a particular service, it becomes difficult to address quality issues and resolve outages in a timely fashion resulting in longer down times, higher call volume, and a less than optimal customer experience.

The VIS feature enables you to create a video inventory system by appending information to the Service Description Table (SDT). The SDT is populated at the multiplex source within the Comcast network, and updated by each device that manipulates the MPEG transport stream with a device identification. Thus, you can determine the path for any given service.

To use the VIS feature:

1. Select **Administration > Global Settings > Video Inventory System (VIS)** section:

Video Inventory System (VIS)

Enable VIS: ☐

System Name:

2. Select **Enable VIS** to enable the VIS feature.
3. In **System Name** enter the required name to append to the SDT table.

Licenses

The following features of ProStream 9100 require licensing:

- Video and audio transcoding - Each transcoded stream requires a license
- VBR pools - ACE DiviTrackMX™

To transcode, you need to purchase a license. For the complete list of available licenses, see [Table 12-3](#).

Licenses are arranged hierarchically according to their capabilities. You can use a license with a high hierarchy for an operation that requires a lower hierarchy, as the following examples show:

- If you purchased a HD transcoding license, you can use it for SD transcoding.
- If you purchased a H.264 transcoding license, you can use it for MPEG-2 transcoding.

ProStream 9100 is shipped with the purchased licenses. If you need an additional license, ProStream 9100 grants you a grace period that allows you to use the unlicensed feature. The grace period is 45 days of device uptime. When the grace period is active, the *License Grace Period Enabled* alarm is raised. Once licenses are installed, the grace period is reloaded.

The following table lists the licensing specifications.

Table 12-1: Licensing Specifications

Parameter	Explanation
Licensed feature	<ul style="list-style-type: none"> ■ Video and audio transcoding (ACE only) - per each stream ■ VBR pools - ACE DiviTrackMX™
License Type	<ul style="list-style-type: none"> ■ Permanent (P)- Once you install a license, it is for an unlimited time ■ Grace - All features are working for 45 days grace period. Grace period of 45 days is counted according to device uptime. ■ Expired - Licenses that are based on a calendar timeline. These licenses are for demo purposes only.
License Management	<p>Licenses are added/removed via the following:</p> <ul style="list-style-type: none"> ■ External license tool (NLM) - this tool resided on another PC. The device uses HTTP to transfer files from/to NLM. See Licensing System Architecture. <p>Note: Adding/removing licenses does not affect running streams. However, it affects licensing allocation.</p> <p>Note: In case of card failure, manually disable transcoding to release licenses.</p>
Firmware Upgrade/Downgrade	Licenses are maintained after upgrade/downgrade.
License Allocation	Licenses are allocated according to their hierarchy.

Licensing System Architecture

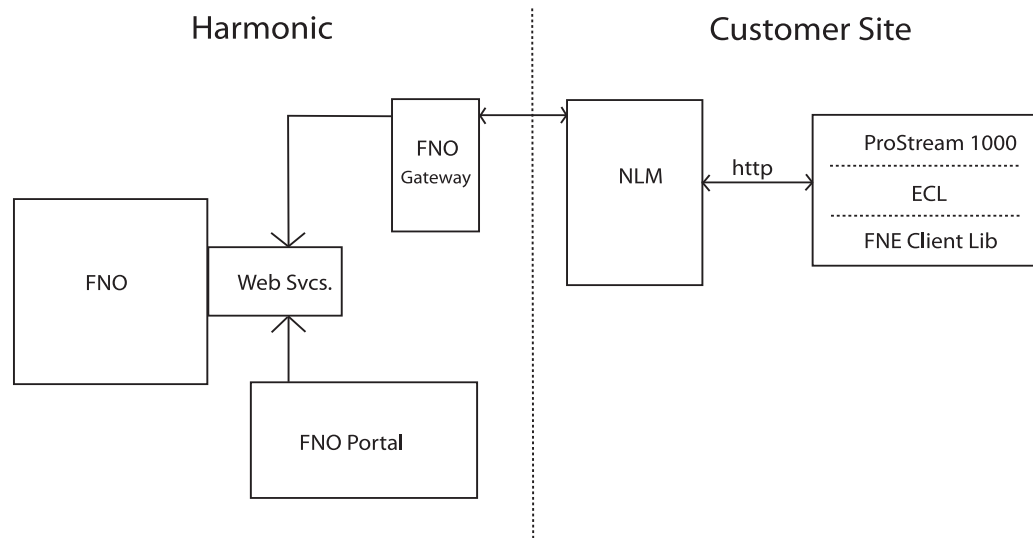


Table 12–2: Licensing System Architecture Legend

Term	Explanation
NLM	Nodelock License Manager. A desktop application
FNO	Flexera database that stores licenses at the Harmonic backoffice

Supported Licenses

The following table lists the currently supported licenses.



NOTE: In the Duration column, **P** indicates that the license is permanent.

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-ANY-FORMAT-DEMO	180 days	ProStream 9100 ACE DEMO Firmware License for all ProStream functions. Demo use only. One per chassis required.	
FW-PRM-9K-ACE-ANY-FORMAT-LAB	P	ProStream 9100 ACE LAB Firmware License for all ProStream functions. LAB use only. One per chassis required.	

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-ALL	P	ProStream 9100 ACE Firmware License for all ProStream functions. One per Chassis required.	
FW-PRM-9K-ACE-ANY-FORMAT-OUT	P	ProStream 9100 ACE Video transcoding Firmware License of any HD, SD, MPEG-2, AVC output. One per Video Stream required.	
FW-PRM-9K-ACE-BACKUP	P	ProStream 9100 ACE Backup Firmware License for all ProStream functions. For Backup use only. One per chassis required.	
FW-PRM-9K-ACE-SPARE	30 days	ProStream 9100 ACE COLD SPARE Firmware License for all ProStream functions. One per chassis required.	
FW-PRM-9K-ACE-ANY-OUT-SD	P	ProStream 9100 ACE Video transcoding Firmware License of any SD MPEG-2 or AVC output. One per Video Stream required.	
FW-PRM-9K-ACE-PIP-AVC-OUT	P	ProStream 9100 ACE Video transcoding Firmware License of AVC PIP output. One per Video Stream required.	

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-AVC-OUT-HD	P	ProStream 9100 ACE Video transcoding Firmware License of HD, AVC output. One per Video Stream required.	FW-PRM-9K-ACE-AVC-OUT-HD -> FW-PRM-9K-ACE-AVC-OUT-HD-STI -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT
FW-PRM-9K-ACE-AVC-OUT-SD	P	ProStream 9100 ACE Video transcoding Firmware License of SD, AVC output. One per Video Stream required.	FW-PRM-9K-ACE-AVC-OUT-SD -> FW-PRM-9K-ACE-AVC-OUT-SD-STI -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-ANY-OUT-SD -> FW-PRM-9K-ACE-AVC-OUT-HD -> FW-PRM-9K-ACE-DWCV-AVC-OUT-SD
FW-PRM-9K-ACE-MP2-OUT-HD	P	ProStream 9100 ACE Video transcoding Firmware License of HD, MPEG-2 output. One per Video Stream required.	FW-PRM-9K-ACE-MP2-OUT-HD -> FW-PRM-9K-ACE-MP2-OUT-HD-STI -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-AVC-OUT-HD

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-MP2-OUT-SD	P	ProStream 9100 ACE Video transcoding Firmware License of SD, MPEG-2 output. One per Video Stream required.	FW-PRM-9K-ACE-MP2-OUT-SD -> FW-PRM-9K-ACE-MP2-OUT-SD-STI -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-ANY-OUT-SD -> FW-PRM-9K-ACE-MP2-OUT-HD -> FW-PRM-9K-ACE-AVC-OUT-SD -> FW-PRM-9K-ACE-AVC-OUT-HD -> FW-PRM-9K-ACE-DWCV-MP2-OUT-SD -> FW-PRM-9K-ACE-DWCV-AVC-OUT-SD
FW-PRM-9K-ACE-DWCV-AVC-OUT-SD	P	ProStream 9100 ACE Firmware License of Downconversion to SD AVC output. One per Video Stream required.	FW-PRM-9K-ACE-DWCV-AVC-OUT-SD -> FW-PRM-9K-ACE-DWCV-AVC-SD-STI -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-AVC-OUT-HD

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-DWCV-MP2-OUT-SD	P	ProStream 9100 ACE Firmware License of Downconversion to SD MPEG-2 output. One per Video Stream required.	FW-PRM-9K-ACE-DWCV-MP2-OUT-SD -> FW-PRM-9K-ACE-DWCV-MP2-SD-STI -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-DWCV-AVC-OUT-SD -> FW-PRM-9K-ACE-MP2-OUT-HD -> FW-PRM-9K-ACE-AVC-OUT-HD
FW-PRM-9K-ACE-HD-AVC-PIP-OUT	P	ProStream 9100 ACE Video transcoding Firmware License of AVC PIP output. One per Video Stream required.	FW-PRM-9K-ACE-HD-AVC-PIP-OUT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-PIP-AVC-OUT -> FW-PRM-9K-ACE-SD-AVC-PIP-OUT -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-AVC-OUT-SD -> FW-PRM-9K-ACE-AVC-OUT-HD

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-SD-AVC-PIP-OUT	P	ProStream 9100 ACE Video transcoding Firmware License of AVC PIP output. One per Video Stream required.	FW-PRM-9K-ACE-SD-AVC-PIP-OUT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-PIP-AVC-OUT -> FW-PRM-9K-ACE-HD-AVC-PIP-OUT -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-AVC-OUT-SD -> FW-PRM-9K-ACE-AVC-OUT-HD
FW-PRM-9K-ACE-MP2-OUT-SD-STI	P	ProStream 9100 ACE Video transcoding Firmware License of SD, MPEG-2 output. One per Video Stream required. Special Term Item.	
FW-PRM-9K-ACE-DWCV-MP2-SD-STI	P	ProStream 9100 ACE Firmware License of Downconversion to SD MPEG-2 output. One per Video Stream required. Special Term Item	

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-AUD-ST-OUT	P	ProStream 9100 ACE Audio transcoding Firmware License of Stereo output.	FW-PRM-9K-ACE-AUD-ST-OUT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-AUD-DD-ST-OUT -> FW-PRM-9K-ACE-AUD-MC-OUT -> FW-PRM-9K-ACE-AUD-DD-MC-OUT -> FW-PRM-9K-ACE-AUD-DD+ST-OUT -> FW-PRM-9K-ACE-AUD-DD+MC-OUT
FW- PRM-9K-ACE-AUD-MC-OUT	P	ProStream 9100 ACE Audio transcoding Firmware License of MultiChannel output.	FW-PRM-9K-ACE-AUD-MC-OUT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-AUD-DD-MC-OUT -> FW-PRM-9K-ACE-AUD-DD+MC-OUT

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-AUD-DD-MC-OUT	P	ProStream 9100 ACE Audio transcoding Firmware License of Dolby Digital (AC-3) MultiChannel output.	FW-PRM-9K-ACE-AUD-DD-MC-OUT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT-> FW-PRM-9K-ACE-AUD-DD+-MC-OUT
FW-PRM-9K-ACE-AUD-DD-ST-OUT	P	ProStream 9100 ACE Audio transcoding Firmware License of Dolby Digital (AC-3) Stereo output.	FW-PRM-9K-ACE-AUD-DD-ST-OUT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-AUD-MC-OUT -> FW-PRM-9K-ACE-AUD-DD-MC-OUT -> FW-PRM-9K-ACE-AUD-DD+-ST-OUT -> FW-PRM-9K-ACE-AUD-DD+-MC-OUT
FW-PRM-9K-ACE-AUD-DD+-MC-OUT	P	ProStream 9100 ACE Audio transcoding Firmware License of Enhanced Dolby Digital (E-AC-3) MultiChannel output.	FW-PRM-9K-ACE-AUD-DD+-MC-OUT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-AUD-DD+ST-OUT	P	ProStream 9100 ACE Audio transcoding Firmware License of Enhanced Dolby Digital (E-AC-3) Stereo output.	FW-PRM-9K-ACE-AUD-DD+ST-OUT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-9K-SPARE-> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-AUD-DD+MC-OUT
FW-PRM-9K-ACE-AUD-DWMIX-OUT	P	ProStream 9100 ACE Audio transcoding Firmware License of MultiChannel downmix to Stereo output.	FW-PRM-9K-ACE-AUD-DWMIX-OUT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-AUD-DWMIX-DD-OUT -> FW-PRM-9K-ACE-AUD-MC-OUT -> FW-PRM-9K-ACE-AUD-DD-MC-OUT -> FW-PRM-9K-ACE-AUD-DD+ST-OUT -> FW-PRM-9K-ACE-AUD-DD+MC-OUT

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-AUD-DWMIX-DD-OUT	P	ProStream 9100 ACE Audio transcoding Firmware License of MultiChannel downmix to Dolby Digital (AC-3) Stereo output.	FW-PRM-9K-ACE-AUD-DWMIX-DD-OUT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-AUD-MC-OUT -> FW-PRM-9K-ACE-AUD-DD-MC-OUT -> FW-PRM-9K-ACE-AUD-DD+ST-OUT -> FW-PRM-9K-ACE-AUD-DD+MC-OUT
FW-PRM-9K-ACE-AUDLVL-MC	P	ProStream 9100 ACE Firmware License of MultiChannel Audio Leveling	FW-PRM-9K-ACE-AUDLVL-MC -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT
FW-PRM-9K-ACE-AUDLVL-ST	P	ProStream 9100 ACE Firmware License of Stereo Audio Leveling.	FW-PRM-9K-ACE-AUDLVL-ST -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-AUDLVL-MC

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-MW-AUD-AAC-OUT	P	ProStream 9100 ACE Audio transcoding Firmware License for Multiscreen Output of Stereo, MultiChannel. One per MBTS group required.	FW-PRM-9K-ACE-MW-AUD-AAC-OUT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-AUD-ST-OUT -> FW-PRM-9K-ACE-AUD-DD-ST-OUT -> FW-PRM-9K-ACE-AUD-MC-OUT -> FW-PRM-9K-ACE-AUD-DD-MC-OUT -> FW-PRM-9K-ACE-AUD-DD+ST-OUT -> FW-PRM-9K-ACE-AUD-DD+MC-OUT
FW-PRM-9K-ACE-MW-MBR-OUT-HD	P	ProStream 9100 ACE Video transcoding Firmware for Multiscreen. AVC HD Multi BitRate group of profiles.	FW-PRM-9K-ACE-MW-MBR-OUT-HD -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-MW-MBR-OUT-SD	P	ProStream 9100 ACE Video transcoding Firmware for Multiscreen. AVC SD Multi Bitrate group of profiles.	FW-PRM-9K-ACE-MW-MBR-OUT-SD -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-MW-MBR-OUT-HD
FW-PRM-9K-DTMX-1	P	ProStream 9100 ACE DTMX Firmware License. One per pool required.	FW-PRM-9K-DTMX-1 -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-DTMX-1-STI	P	ProStream 9100 ACE DTMX Firmware License. One per pool required. Special Term Item.	
SW-LIC-PRM-9K-DT	P	ProStream 9100 DivitrackIP Firmware License. One per pool required.	SW-LIC-PRM-9K-DT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-SLATE-SRV-1	P	ProStream 9100 Slate Insertion Firmware License. One per service required.	FW-PRM-9K-SLATE-SRV-1 -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-EAS-1	P	ProStream 9100 EAS Firmware License. One per service required.	FW-PRM-9K-EAS-1 -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-SELCSER-1	P	ProStream 9100 Selective Encryption Firmware License. One per service required.	FW-PRM-9K-SELCSER-1 -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-BISS-FIX-SRV-1	P	ProStream 9100 BISS Fixed Key Firmware License. One per service required.	FW-PRM-9K-BISS-FIX-SRV-1 -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-8VSB	P	ProStream 9100 ACE Firmware License for one 8VSB Receiver.	FW-PRM-9K-8VSB -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-DESAES-1	P	ProStream 9100 AES DESER Firmware License. One per service required.	FW-PRM-9K-DESAES-1 -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-SCTE35-1	P	ProStream 9100 SCTE35 insertion Firmware License. One per service required.	FW-PRM-9K-SCTE35-1 -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-AES-CW	P	ProStream 9100 AES SCR Firmware License. One per service required.	FW-PRM-9K-AES-CW -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-DVB-CW	P	ProStream 9100 DVB SCR Firmware License. One per service required.	FW-PRM-9K-DVB-CW -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPAR
FW-PRM-9K-DESFIX-SRV-1	P	ProStream 9100 Fixed Key DESCR Firmware License. One per service required.	FW-PRM-9K-DESFIX-SRV-1 -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-SCRFIX-SRV-1	P	ProStream 9100 Fixed Key Firmware License. One per service required.	FW-PRM-9K-SCRFIX-SRV-1 -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-FEC-TS-1	P	ProStream 9100 FEC Firmware License. One per Transport Stream required.	FW-PRM-9K-FEC-TS-1 -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-SELC-EHP-1	P	ProStream 9100 Encryption Hacking Prevention Scrambling Firmware License. One per service required.	FW-PRM-9K-SELC-EHP-1 -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-DEVICE-REDUNDANCY	P	ProStream 9100 Standalone Device Redundancy Firmware License. One per Chassis required.	FW-PRM-9K-DEVICE-REDUNDANCY -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-ACE-MW-MBR-OUT	P	ProStream 9100 ACE Video transcoding Firmware for Multiscreen. AVC Multi BitRate group of profiles.	FW-PRM-9K-ACE-MW-MBR-OUT -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT -> FW-PRM-9K-ACE-MW-MBR-OUT-HD -> FW-PRM-9K-ACE-MW-MBR-OUT-SD

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-ACE-LOGO	P	ProStream 9100 ACE Logo insertion for Broadcast. Up to 1/8 size of screen size. One per Video Stream required.	FW-PRM-9K-ACE-LOGO -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL-> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FM-PRM-9K-ACE-MW-LOGO	P	ProStream 9100 ACE Logo insertion for Multiscreen. Up to 1/8 of screen size. One per MBTS group required.	FW-PRM-9K-ACE-MW-LOGO -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL-> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-DPI-AVC-HD	P	ProStream 9100 for H.264 AVC HD splicing Firmware License. One per service required.	FW-PRM-9K-DPI-AVC-HD -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL-> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-DPI-MP2-HD -> FW-PRM-9K-DPI-AVC-SD -> FW-PRM-9K-DPI-MP2-SD
FW-PRM-9K-DPI-AVC-SD		ProStream 9100 for H.264 AVC SD splicing Firmware License. One per service required.	FW-PRM-9K-DPI-AVC-SD -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL-> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-DPI-MP2-SD

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-DPI-MP2-HD		ProStream 9100 for MPEG-2 HD splicing Firmware License. One per service required.	FW-PRM-9K-DPI-MP2-HD -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL-> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-DPI-MP2-SD
FW-PRM-9K-DPI-MP2-SD		ProStream 9100 for MPEG-2 SD splicing Firmware License. One per service required.	FW-PRM-9K-DPI-MP2-SD -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL-> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE ->
FW-PRM-9K-ACE-DPI-COND	P	ProStream 9100 ACE Firmware License of SCTE-35 stream conditioning. One per video stream required.	FW-PRM-9K-ACE-DPI-COND -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL-> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE ->
FW-PRM-9K-SUPPORT	45 days	ProStream 9100 ACE SUPPORT Firmware License for all ProStream functions. 45 days. One per chassis required.	
FW-PRM-9K-DVBSUB-BURN	P	ProStream 9100 DVB-sub burn-in Firmware License per 1 service.	FW-PRM-9K-DVBSUB-BURN -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL-> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-SRV-SUB	P	ProStream 9100 Splicing Service Substitution Firmware License. One per service required.	FW-PRM-9K-SRV-SUB -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL-> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-VLAN-TAG-TS-1	P	ProStream 9100 VLAN Tagging Firmware License at the output. One per Transport Stream required.	FW-PRM-9K-VLAN-TAG-TS-1-> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL-> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-ACE-AVC-OUT-SD-STI	P	ProStream 9100 ACE Video transcoding Firmware License of SD, AVC output. One per Video Stream required. Special Term Item.	
FW-PRM-9K-ACE-AVC-OUT-HD-STI	P	ProStream 9100 ACE Video transcoding Firmware License of HD, AVC output. One per Video Stream required. Special Term Item.	
FW-PRM-9K-ACE-MP2-OUT-HD-STI	P	ProStream 9100 ACE Video transcoding Firmware License of HD, MPEG-2 output. One per Video Stream required. Special Term Item.	
FW-PRM-9K-ACE-DWCV-AVC-SD-STI	P	ProStream 9100 ACE Firmware License of Downconversion to SD AVC output. One per Video Stream required. Special Term Item.	

Table 12–3: Supported Licenses

License Name	Duration	Description	Hierarchy
FW-PRM-9K-SML-SWITCH	P	ProStream 9100 Seamless Service Substitution for Blackout. Firmware License. One per service required.	FW-PRM-9K-SML-SWITCH-> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL-> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-DT-REGIONAL-SRV	P	License for sharing common services between regional statmux pools. The license is per one duplicate of the common services.	FW-PRM-9K-DT-REGIONAL-SRV -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE
FW-PRM-9K-ACE-AUDLVL-NCC	P	Firmware option for ProStream 9000 ACE platform, enabling automatic audio leveling of one (1) embedded audio channel following NCC standard. The purchase of this option, when and if available, is separate and independent from the purchase of all equipment and/or services contained within this quotation. Requires ACE Internal Video Processing card.	FW-PRM-9K-ACE-AUDLVL-NCC -> FW-PRM-9K-SUPPORT -> FW-PRM-9K-ACE-ANY-FORMAT-LAB -> FW-PRM-9K-ACE-ANY-FORMAT-DEMO -> FW-PRM-9K-ACE-ALL -> FW-PRM-9K-ACE-BACKUP -> FW-PRM-9K-ACE-SPARE -> FW-PRM-9K-ACE-ANY-FORMAT-OUT

Working with Licenses

To transcode and to work with VBR pools, you need to purchase licenses.

To manage your licenses, that is to install and to remove licenses, use the NLM (Nodelock License Manager), an external tool. See [Licensing System Architecture](#).

Once you select **Transcoding** per audio/video PID (Re Muxing tab) and click **Apply**, the device activates the license according to the output transcoding format. (See following captures)

NOTE: If you did not configure video or audio transcoding, yet selected **Transcoding**, once you click **Apply**, the default license is activated.

Licenses Hierarchy

Licenses are arranged in a hierarchical order. Hierarchy is divided as follows:

- Video - Hierarchy among video licenses
- Audio - Hierarchy among audio licenses

The following table lists the licensing hierarchy. Hierarchy is arranged from left to right. The left most license is the most limited license and the right most license is the most comprehensive one.

License Hierarchy – Example 1

If you purchased license: FW-PRM-9K-ACE-MP2-OUT-HD and you need to output an MPEG-2 SD stream.

Due to license hierarchy, you can use the FW-PRM-9K-ACE-MP2-OUT-HD license to output an MPEG-2 SD stream.

License Hierarchy – Example 2

If you purchased license: FW-PRM-9K-ACE-MP2-OUT-HD and you need to output an MPEG-2 SD stream.

Due to license hierarchy, you can use the FW-PRM-9K-ACE-MP2-OUT-HD license to output an MPEG-2 SD stream. However, if you also need to transcode to HD MPEG-2 output, your purchased license is already occupied by the MPEG-2 SD stream. In this case, you can transcode to HD MPEG-2 output with a Grace type license for 45 device-time days. During this time, you can purchase another license and install it.

To use the FW-PRM-9K-ACE-MP2-OUT-HD, purchase the FW-PRM-9K-ACE-MP2-OUT-SD license. Once the latter is installed, licenses are re-allocated, and as a result FW-PRM-9K-ACE-MP2-OUT-HD is free for MPEFG-2 HD transcoding.

License Status

To view license status:

1. Select **Administration > Licensing**.

FW Licenses						
Serial Number:		053443363				
Grace Period Remaining (Days):		45				
PN	Description	Installed	In Use	Required	Expiration (Days)	
FW-PRM-9K-ACE-ALL	Firmware License for Transcoding FIRMWARE LICENSE FOR ALL ProStream 1000 FUNCTIONS	1	1	0	Permanent	
FW-PRM-9K-ACE-ANY-FORMAT-DEMO	Firmware License for DEMO enables output of HD, SD, MPEG-2, H.264, audio Transcoding	0	0	0	-	
FW-PRM-9K-ACE-ANY-FORMAT-LAB	Firmware License for LAB enables output of HD, SD, MPEG-2, H.264, audio Transcoding	0	0	0	-	
FW-PRM-9K-ACE-ANY-FORMAT-OUT	Firmware License for ANY output format: HD, SD, MPEG-2, H.264 Transcoding	0	0	0	-	
FW-PRM-9K-ACE-BACKUP	Firmware License for Transcoding FIRMWARE LICENSE FOR ALL ProStream 1000 FUNCTIONS for BACKUP	0	0	0	-	
FW-PRM-9K-ACE-SPARE	Firmware License for ACE COLD SPARE HD, SD, MPEG-2, H.264 output Transcoding	0	0	0	-	
FW-PRM-9K-ACE-ANY-OUT-SD	Firmware License for SD MPEG-2, H.264 output Transcoding	0	0	0	-	
FW-PRM-9K-ACE-PIP-AVC-OUT	Firmware License for H.264 PIP output Transcoding	0	0	0	-	
FW-PRM-9K-ACE-AVC-OUT-HD	Firmware License for HD, H.264 output Transcoding	20	0	0	Permanent	
FW-PRM-9K-ACE-AVC-OUT-SD	Firmware License for SD, H.264 output Transcoding	10	0	0	Permanent	
FW-PRM-9K-ACE-MP2-OUT-HD	Firmware License for HD, MPEG-2 output Transcoding	0	0	0	-	
FW-PRM-9K-ACE-MP2-OUT-SD	Firmware License for SD, MPEG-2 output Transcoding	0	0	0	-	
FW-PRM-9K-ACE-DWCV-AVC-OUT-SD	Firmware License for DownConvert to SD, H.264 output Transcoding	0	0	0	-	
FW-PRM-9K-ACE-DWCV-MP2-OUT-SD	Firmware License for DownConvert to SD, MPEG-2 output Transcoding	0	0	1	-	
FW-PRM-9K-ACE-HD-AVC-PIP-OUT	Firmware License for HD H.264 PIP output Transcoding	20	0	0	Permanent	
FW-PRM-9K-ACE-SD-AVC-PIP-OUT	Firmware License for SD H.264 PIP output Transcoding	10	0	0	Permanent	
FW-PRM-9K-ACE-AUD-ST-OUT	Firmware License for Audio Transcoding of Stereo output Transcoding	0	0	0	-	

2. **Serial Number** - View the unique number of licenses host, usually the chassis serial number.
3. **Grace period** - Indicates the grace period in days.

When the grace period expires, you are asked to purchase permanent licenses.

FW Licenses	
Serial Number:	053443363
Grace Period Remaining (Days):	45

Device full Grace period

FW Licenses	
Serial Number:	200111
Grace Period Remaining (Days):	0
Grace Period License has expired. You have unlicensed services on the device. Please contact Harmonic to purchase permanent licenses.	

Device Grace period has expired

4. In the table, view the following:
 - ❑ Feature Part Number - The part number of the license
 - ❑ Description - A short description of the license. See [Licenses](#) on page 220.
 - ❑ Installed - The total number of licenses per type installed on the device
 - ❑ In Use - Indicates the number of licenses per type that are currently being used
 - ❑ Required - The number of licenses requested for current transcoding configuration
 - ❑ Expiration - Indicates the expiration date of the license. For non-expiring licenses, Permanent appears.

Licenses appear in the table in the following colors:

Color	Explanation
Grayed out	Licenses that are not installed or requested
Gray	Licenses that are properly installed
Red	Licenses in a grace period
Yellow	Licenses that are not installed and use other licenses according to licensing hierarchy



NOTE: In case of an internal licensing failure, a general failure message appears in the **Licenses** page.

Syslog Settings

ProStream 9100 can send data to a Syslog server for logging, monitoring, and troubleshooting purposes. The Syslog server presents the logged data in a user friendly interface that enables you to track device activity.

The syslog server is a computer that the Syslog Watcher application is installed on it. For installation instructions, see Syslog Watcher documentation.

The following section describes and instructs you on how to configure the communication between the device and the Syslog server.

Syslog Configuration

To log device activity:

1. Enable the Syslog option and enter the Syslog server IP address as instructed below.
2. Select **Administration > Remote Servers**.

IP Address	UDP Port	Description
127.0.0.1	514	None

New Remove

3. **IP Address** - enter the IP address of the Syslog server.
4. **UDP Port** - enter the port number over which the Splicer sends the messages and the Syslog server sniffs. The default port is 514. If you change the port number, change it also at the Syslog server.

To allow the Syslog server to sniff the port, configure the Firewall of the Syslog server to open the Syslog port for sniffing.

5. To enable logging device activity, click **Apply**. In this version, splicing activities are logged.

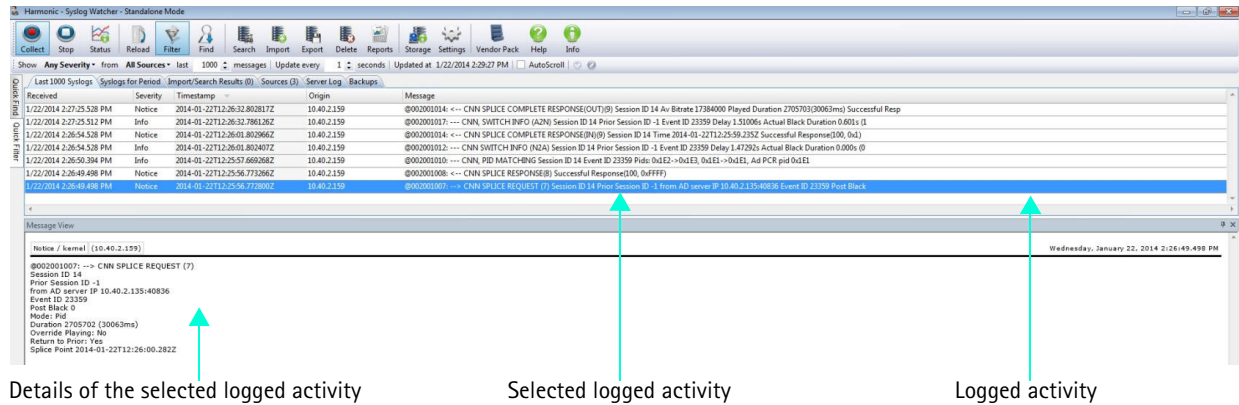
If you enable Syslog and there are communication problems between the splicer and the Syslog server the *Syslog Server is Unreachable* alarm is raised.

Splicing Logging

Once you enable Syslog, you can retrieve the following data:

- Indications of actual Splice activity - the exchange of messages between Splicer and AD server with indication of the sender:
 - Init Request
 - Init Response
 - Cue Request
 - Cue Response
 - Splice Request
 - Splice Response
 - Splice Complete Response
 - Abort Request
 - Abort Response
 - Keep Alive Request
 - Keep Alive Response
- Information about the splicing activity
 - PID Matching - Information about the relations between network PID and ad PID prior to the splice event
 - Switch Info - Information about the switching between the feeds related to the splice event

The following figure shows the logged splicing activities as they are presented by the Syslog server:



The Syslog server presents each activity with the following parameters:

Parameter	Explanation
Received	Time the message was logged
Severity	Message severity
Time stamp	Time the message was issued
Origin	The device that sent the message
Message	Message text. Each message has an ID

Once you select a logged activity, you can view its details in a friendly and legible format at the bottom section.

DNS

Domain Name System enables users to name computers and network services. DNS can be used, for example, in blackout services, to balance blackout server loads.

DNS naming conventions

- DNS names consist of one or more parts, called labels, that are conventionally concatenated. For example, example.hlit.local is a possible concatenated DNS.
- The Harmonic implementation of DNS permits a 32-character domain name.

Configuring a DNS Server

1. Select **Administration>Remote Servers**
2. In the DNS section, click **Add** to add a new server.
3. In the line that appears, add the IP address.
4. Configure the following:
 - ❑ Server Port: (Default 53).
 - ❑ Retries.

- ❑ Timeout time in seconds.
- 5. Enter the domain name.

The screenshot shows a web-based configuration interface for DNS settings. On the left is a sidebar with links to 'Assets', 'Remote Servers', and 'User Management'. The main content area is titled 'DNS' and features a 'Servers' table. The table has one row with a checked checkbox and the IP address '10.0.0.0'. Below the table are 'Add' and 'Remove' buttons. At the bottom of the panel, there are four input fields: 'Server Port' with the value 53, 'Retries' with the value 2, 'Timeout' with the value 10, and an empty 'Domain' field.

Device Redundancy

To ensure the continuous transmission of video/data streams, transmitting networks employ a variety of protection or redundancy options. Redundancy solutions are implemented where high availability is required. Redundancy solutions provide various levels of assurance (power supply versus device redundancy) and are application dependent.

This section discusses the redundancy solution in the stream processing realm that relates to device redundancy of devices that work in standalone mode. This solution eliminates the need for NMX management for achieving device redundancy. The redundancy mechanism is a 1:1 device redundancy and it protects from severe failures and provides a high level of assurance.

To allow redundancy, the system is organized as follows:

- Primary device - One of the ProStream devices is defined as the Primary device. This is the device that advertises the latest configuration.
- Backup device - One of the devices is defined as the Backup device. This is the device that gets the most updated configuration from the primary device. Usually the backup device polls the configuration of the primary device once redundancy is applied and during operation to monitor for changes in the primary configuration. Once the backup device gets the configuration it performs the following:
 - ❑ Updates the configuration and applies it - When updating configuration, basic device parameters are not updated. For example, device IP address and the assignment of ports. You need to make sure that the configuration of the port assignment is identical for the devices in the same group ID. See page 248.
- Device Connectivity - Primary and backup devices are connected via management, or CAS or GbE ports.
 - ❑ The connection over any of the ports should be multicast.
 - ❑ On each device, in the same redundancy group, at least two of the ports eligible for redundancy should be assigned.
 - ❑ On each device, in the same redundancy group, at least same two ports should be assigned for redundancy.
 - ❑ The connection is either directly or via a switch. The devices communicate via HHP

(Harmonic Heartbeat Protocol). The devices send to each other heartbeat messages at an interval defined in milliseconds.

- Group ID (GID) - Network includes multiple Harmonic devices with same ID. To differentiate between the devices, devices that are on the same redundancy system, are associated to the same group. Currently, a redundancy system consists of two devices only, a primary device and its backup device.
- Redundancy Types:
 - ❑ Warm - Backup gets the configuration of the primary device and applies it but the backup is in active, it does not broadcast
 - ❑ Hot - Backup gets the configuration of the primary device and applies it and backup is active, it broadcasts
- Redundancy Switch Types:
 - ❑ Manual - Upon a Device Redundancy Trigger (DRT), only a manual redundancy switch takes place. That is, you need to switch from primary to backup.
 - ❑ Automatic - Upon a Device Redundancy Trigger (DRT), an automatic redundancy switch takes place.

The following table lists the redundancy switch types and the state of the primary and backup devices

Redundancy Switch Type	Primary	Backup - Warm	Backup - Hot
Manual	Active	In active	Active
Automatic	Active/In active*	Active/In active*	N/A

* Pending device state - always one device is active and the other is in active.

List of DRTs (Device Redundancy Triggers)

When the following alarms are raised, a redundancy switch takes place:

- ❑ CPC HW Failure
- ❑ Card Missing
- ❑ Card Mismatch
- ❑ 8VSB Card HW Failure
- ❑ GbE Card HW Failure
- ❑ Quad GbE Card HW Failure
- ❑ ASI Input Signal Loss
- ❑ ASI Input Sync Loss
- ❑ Failure Communication between Primary and Backup
- ❑ GbE Port Failed
- ❑ GbE Input IP Packet CRC Error
- ❑ Failure Generating CW

To see the list of alarms related to redundancy, see [Troubleshooting](#), under Platform.

Configuring Device Redundancy

The following instructions refer to 1:1 device redundancy. You need to configure the redundancy parameters for both the primary and for the backup device. The instructions refer to both, unless otherwise indicated.

To configure device redundancy:

1. Select **Platform > Redundancy > General**.



General

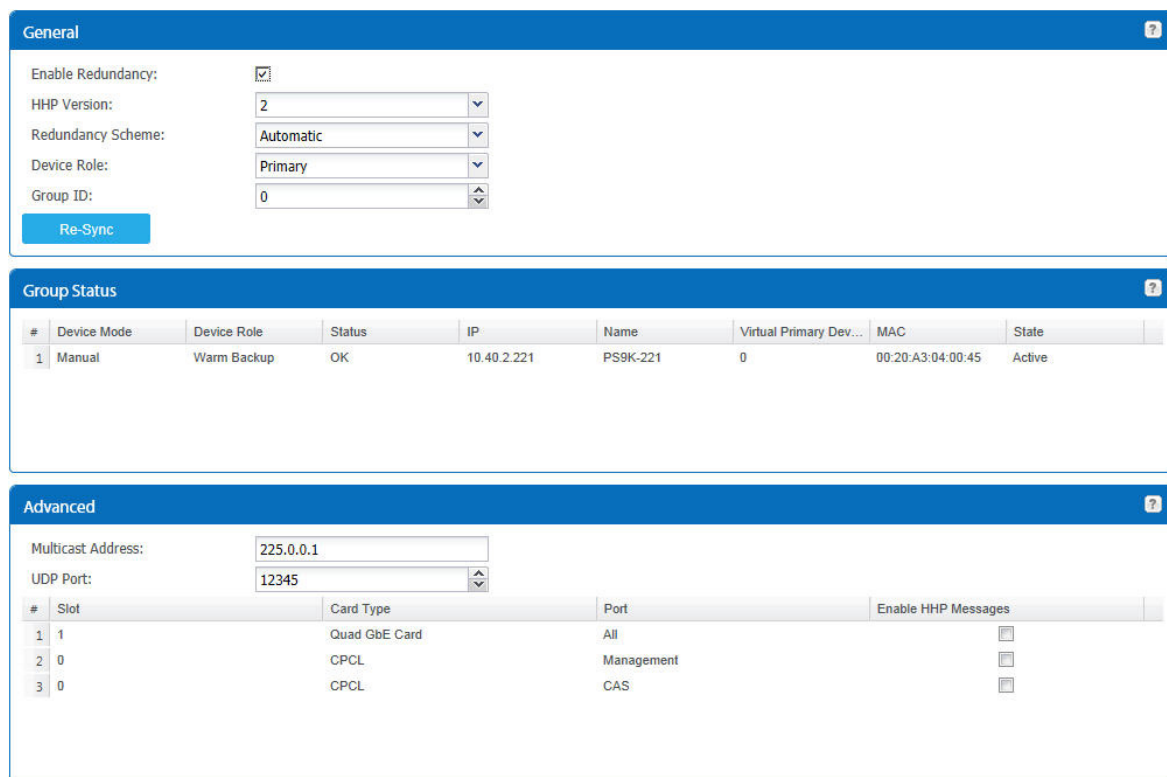
Enable Redundancy: ☐

2. Select **Enable Redundancy**.



NOTE: If two devices are working in redundancy mode and you disable redundancy, each device starts broadcasting as a standalone device.

The tab is updated as the following picture shows:.



General

Enable Redundancy: ☒

HHP Version: 2

Redundancy Scheme: Automatic

Device Role: Primary

Group ID: 0

Re-Sync

Group Status

#	Device Mode	Device Role	Status	IP	Name	Virtual Primary Dev...	MAC	State
1	Manual	Warm Backup	OK	10.40.2.221	PS9K-221	0	00:20:A3:04:00:45	Active

Advanced

Multicast Address: 225.0.0.1

UDP Port: 12345

#	Slot	Card Type	Port	Enable HHP Messages
1	1	Quad GbE Card	All	<input type="checkbox"/>
2	0	CPCL	Management	<input type="checkbox"/>
3	0	CPCL	CAS	<input type="checkbox"/>

3. **HHP Version** - open the **HHP Version** list and select the required version:
 - ☐ Version 1 - Applies to NMX device redundancy only.
 - ☐ Version 2 - By default **Version 2** is selected.
4. **Redundancy Scheme** - Open the **Redundancy Mode** list and select either of the following:
 - ☐ Automatic - The default option
 - ☐ Manual - The redundancy switch is done by the user.

5. **Device Role** - Open the **Device Role** list and select one of the following options:
 - ☐ Primary - This device advertises the latest configuration.
 - ☐ Warm Backup - Gets the configuration of the primary device and applies it but the backup is inactive and does not broadcast.
 - ☐ Hot Backup - Gets the configuration of the primary device, applies it and broadcasts.
6. **Group ID** - Enter the required Group ID number. Group ID should be the same for the primary and backup device.



NOTE: You should not move a device from a group when it is broadcasting and is connected to a network.

7. Click **Apply**.

The redundant devices start communicating via the HHP protocol. The backup device obtains the configuration of the primary device and during operations monitors for changes in the configuration of the primary device.

Re-Synchronization Button

The Resync button allows to obtain the configuration of the primary. Typically, the backup device polls the primary configuration during operation to monitor for changes in the configuration. Use this button in case a problem arises.

Viewing Redundancy Group Information

To view redundancy group information:

1. Log into the device via the web client. See [Logging into ProStream 9100](#).
2. Select **Platform > Redundancy > General**
3. Focus on **Group Status**.

Group Status								
#	Device Mode	Device Role	Status	IP	Name	Virtual Primary Dev...	MAC	State
1	Manual	Warm Backup	OK	10.40.2.221	PS9K-221	0	00:20:A3:04:00:45	Active

4. View the following for all devices of the group:

Parameter	Explanation
#	Sequential number
Device Mode	Indicates whether Automatic or Manual.
Device Role	Indicates whether primary /warm backup/hot backup
Status	OK - device is up and running Fail - device is faulty
IP	The IP address of the device
Name	The name of the device

Parameter	Explanation
Virtual Primary Device	The group number of the virtual primary device.
MAC	The MAC address of the device
Configuration Sync.	The exact time and date the last configuration synchronization between the primary and backup took place. For future use.
State	The actual state of the device: <ul style="list-style-type: none"> ■ Active ■ Inactive - Standby

Advanced Redundancy Configuration

The Advanced tab allows you to view and configure the GbE ports parameters. It is only for advanced users.

To configure GbE port parameters:

1. Select **Platform > Redundancy > General**.
2. Focus on **Advanced**.

#	Slot	Card Type	Port	Enable HHP Messages
1	1	Quad GbE Card	All	<input type="checkbox"/>
2	0	CPCL	Management	<input type="checkbox"/>
3	0	CPCL	CAS	<input type="checkbox"/>

3. In **Multicast**, enter the multicast address that serves the redundancy. The address should be identical for the primary and the backup device.
4. In **UDP port**, select the required UDP port,
5. View and configure the GbE ports to carry the redundancy data

Parameter	Explanation
Slot #	The slot number on which the GbE port is located.
Card Type	Indicates whether CPCL card, or any of the available cards.
Port	Indicates the following: <ul style="list-style-type: none"> ■ GbE - port number ■ Main - whether management or CAS ■ All - refers to all card ports
HHP Messages	If selected, the port communicates via an HHP protocol for redundancy purposes.



NOTE: Configure at least two ports to communicate via HHP.

Configuring EAS Parameters

To configure the Emergency Alert System:

1. Select **Platform** > **EAS**.

General

EAS Mode: None

2. Open the **EAS Mode** list and select one of the following:
 - ☐ None - No EAS application
 - ☐ GPI Converter - ProStream 9100 serves as the GPI converter that generates EAS request.
 - ☐ EAS Receiver - ProStream 9100 serves as the EAS receiver. Once you select EAS Receiver, additional fields appear for configuring the EAS receiver and the input EAS channel.

Configuring EAS Receiver

To configure EAS receiver:

1. Select **EAS Receiver**. Configure the following fields in the EAS tab:

General

EAS Mode: EAS Receiver

EAS Receiver

IP Address: 224.0.0.1

UDP Port: 1

SSM (Source-Specific Multicast):

#	Enable	IP Address
1	<input type="checkbox"/>	
2	<input type="checkbox"/>	

Site ID: 1

Group ID: 1

Activate EAS

EAS Channels

<input checked="" type="checkbox"/> Source TS	Program	Name

Add Remove

2. **IP Address** - Enter the EAS receiver IP address.
3. **UDP Port** - Enter the UDP port to receive the EAS.
4. **SSM (Source Specific Multicast)** - Source Specific Multicast. This feature enables you to define up to four different sources for the TS by entering the IP address of the upstream transmitting devices. This feature is relevant only when working in GMPv3. To configure it select Enable and enter the multicast IP address.
5. **Site ID** - Enter the site ID of the EAS receiver.
6. **Group ID** - Enter the group ID of the EAS receiver.
7. Click **Active AES**, to activate ProStream 9100 as AES receiver.
8. To add an EAS channel, click **Add**.
9. Open the **Source TS** and select the required TS. This list is populated with TSs with EAS services.
10. In **Program**, enter the required service ID, that is an EAS service.
11. In **Name**, enter the required service name for this EAS service.



NOTE: See also [Configuring EAS Parameters](#).

Configuring GPI Converter

To configure GBPI Converter:

1. Select **GPI Converter**. The following fields appear in the EAS tab:

General

EAS Mode: GPI Converter

GPI Converter

GPI Control: Manual

Command: None

IP Address: 224.0.0.1

UDP Port: 1

SSM (Source-Specific Multicast):

#	Enable	IP Address
1	<input checked="" type="checkbox"/>	
2	<input checked="" type="checkbox"/>	

Site ID: 1

Group Id: 1

2. Open the **GPI Control** list and select either Manual or Automatic. The control can be:
 - ☐ Automatic - A corresponding command is sent according to the IRD signal.
 - ☐ Manual - The user is required to send the command manually
3. Open the Command list and select one of the following:
 - ☐ None - No EAS activation command
 - ☐ Activate - EAS activation command is enabled and the GPI is ready to send it to the EAS

- receiver
 - ❑ Deactivate - EAS de-activation command is enabled and the GPI does not send it to the EAS receiver
- 4. In IP Address, enter the IP address for sending and receiving EAS commands.
- 5. In UDP port, select the UDP port number for sending and receiving EAS commands.
- 6. **SSM (Source Specific Multicast)** - Source Specific Multicast. This feature allows you to define up to four different sources for the TS by entering the IP address of the upstream transmitting devices. This feature is relevant only when working in GMPv3. To configure it select Enable and enter the multicast IP address.
- 7. In **Site ID**, enter the site ID of the EAS receiver.
- 8. In **Group ID**, enter the group ID of the EAS receiver.

ESAM (Event Signaling and Management)

The Event Signaling and Management feature is a blackout solution for linear channels. It is based on the ESAM (SMI and MMI) interface that is used for ad insertion and blackout on the multiscreen platform. The ESAM system includes the following:

BMS (Blackout Management System). The BMS receives blackout information from the content providers. The BMS has the following information:

- Blackout schedule for each program and blackout zone
- Database of all the Virtual IRDs (VIRD)
- Database of all the possible alternative feeds

The BMS communicates with the LSS and LSP over ESAM

LSP - (Linear Stream Processor). The LSP is the Harmonic ProStream located in the Central Headend. The LSP supports synchronous (from incoming SCTE35-2012) and asynchronous signaling (from the BMS), and based on these signaling, it generates SCTE35-2012 for each program that is streaming to the IP Network. The protocol between BMS to the LSP is the standard ESAM-SMI

LSS - (Linear Stream Switcher). The LSS is the Harmonic ProStream located at the edge of the network and is responsible for switching to and from alternative feed, based on BMS commands. The LSS can manage multiple blackout zones for each input program, meaning, multiple VIRDs for each input program. The LSS has a database of all the VIRDs. The LSS communicates with the BMS over ESAM. The LSS support up to 400 VIRDs.

VIRD (Virtual IRD). It represents a single program at the output of the LSS, for a specific blackout zone, and it replaces a physical IRD that is feeding today the legacy QAM plant.

To configure a program with ESAM, see [Event Signaling and Management \(ESAM\) Feature](#).

Configuring General ESAM Parameters

To configure general ESAM Parameters:

1. Select **Platform > ESAM**:

The screenshot displays the ESAM configuration interface with three main sections:

- Acquisition Point Identifier:** Contains three settings:
 - Generate Automatic Concatenation:** A checked checkbox.
 - String Concatenation:** An empty text input field.
 - Concatenate device name to API:** A checked checkbox.
- ESAM Server:** Features a table with columns: Name, IP Address, TCP Port, and URI. The 'Name' column has a checked checkbox. Below the table is a 'Menu' dropdown button. At the bottom are 'New' and 'Remove' buttons.
- Emergency Switch:** Contains one setting:
 - Automatic switch to primary on ESAM failure:** An unchecked checkbox.
 Below this is an 'Emergency switch to main' button.

- To configure the Acquisition Point Identifier, focus on this section:



NOTE: Configure the following steps (4 - 6) before configuring LSS/LSP.

- Generate Automatic Concatenation** - Applies to LSS only. Select to add a string concatenation to the API (Acquisition Point Identifier) of the program.
- String Concatenation** - Enter the string concatenation.
- Concatenate Device Name to API** - If selected, the device name is added to the string concatenation. This option applies to LSP only.
- To configure the ESAM servers, focus on the ESAM Server section:

This screenshot shows the ESAM Server configuration section, which includes a table with the following columns: Name, IP Address, TCP Port, and URI. The 'Name' column has a checked checkbox. A 'Menu' dropdown button is located to the right of the table. At the bottom of the section are 'New' and 'Remove' buttons.

- Click **New** to add a blank line to the table.
- Name** - Enter the name of the ESAM server.

9. **IP Address** - Enter the IP address of the server.
10. **TCP Port** - Select the port over which the ESAM server listens to messages.
11. **URI** - Enter the type of notification event, such as blackout.
12. To engage Emergency Switch, focus on the **Emergency Switch** section
 - ❑ **Automatic Switch to Primary on ESAM Failure** - when selected, a communication failure automatically switches the LSS services to the primary LSS services.
 - ❑ **Emergency switch to main** - manually switches from an alternate service to a primary service.



NOTE: The Emergency switch to main button can also be found at **Configuration>Logical Outputs > Programs > Program x: Properties > ESAM**



NOTE: If the service is already defined as Main, pressing the Emergency switch to main will have no effect.

Chapter 13

Backing Up and Restoring Device Configuration

Overview

You can save the ProStream configuration and upload it to your device or any other ProStream unit when required. Downloading and uploading the configuration enables the following:

- Back up configuration
- Upload the configuration to another device
- Upload various settings to the device.

Backing Up the Configuration

When downloading the ProStream configuration it is saved as an XML file. The XML file includes all the configuration beside the IP address, Subnet mask and default gateway of ETH1 port.

Back up the current configuration to a file. The default location of the XML file is the Downloads folder and the default name is Platform. You can change the name and save it to your defined location on the device hard disk.

To back up the configuration:

1. Log into the device.
2. Select Platform > **Backup/Restore**.
3. Focus on **Backup Device Configuration to a File**:



Backup Device Configuration to a File

Backup

4. To back up the configuration, click **Backup**.

The file is created in the default location with a default name of Downloads > Platform.xml

Restoring Configuration from a File

When restoring a configuration, the uploaded configuration is loaded to the device and the previous configuration is removed.

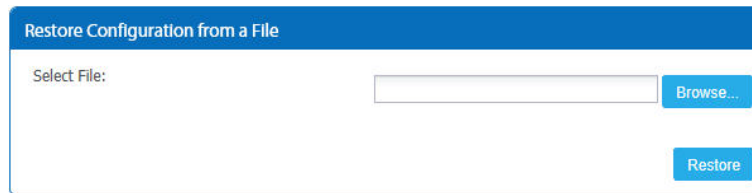


NOTE: It is recommended to back up the current configuration before restoring, as restoring overwrites the current configuration

To restore the configuration:

1. Select Platform > **Backup/Restore**.

2. Focus on the **Restore Configuration from a File** section:



1. Enter the file name or click **Browse** to find it.
2. Click **Open**.

The file name appears in the **Select File** box.

3. To restore, click **Restore**.

The previous configuration is removed and the new one is uploaded.

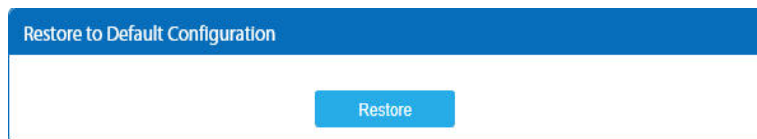


NOTE: The uploaded configuration does not include the IP address, Subnet Mask and default gateway of ETH1.

Restoring Default Configuration

To restore the default configuration:

1. Select **Platform > Backup/Restore**.
2. Focus on **Restore to Default Configuration**:



3. Click **Restore**.

The previous configuration is removed and the device boots up with the default configuration

Appendix A

Contacting the Technical Assistance Center

Harmonic Global Service and Support has many Technical Assistance Centers (TAC) located globally, but virtually co-located where our customers can obtain technical assistance or request on-site visits from the Regional Field Service Management team. The TAC operates a Follow-The-Sun support model to provide Global Technical Support anytime, anywhere, through a single case management and virtual telephone system. Depending on time of day, anywhere in the world, we will receive and address your calls or emails in one of our global support centers. The Follow-the-Sun model greatly benefits our customers by providing continuous problem resolution and escalation of issues around the clock.

Report an issue online at:

<http://harmonicinc.com/webform/report-issue-online>

Table A-1: Technical Support Phone Numbers and Email Addresses

Region	Telephone Technical Support	Email
Americas	888.673.4896 (888.MPEG.TWO) or +1.408.490.6477	support@harmonicinc.com
Europe, Middle East, and Africa (EMEA)	+44.1252.555.450	emeasupport@harmonicinc.com
India	+91.120.498.3199	apacsupport@harmonicinc.com
Russia	+7.495.926.4608	rusupport@harmonicinc.com
Mainland China	+86.10.6569.5580	chinasupport@harmonicinc.com
Japan	+81.3.5565.6737	japansupport@harmonicinc.com
Asia Pacific – Other Territories	+852.3184.0045 or 65.6542.0050	apacsupport@harmonicinc.com

The Harmonic Inc. support website is:

<http://www.harmonicinc.com/content/technical-support>

The Harmonic Inc. software downloads sites are:

Distribution and Delivery Software	ftp://ftp.harmonicinc.com
Production and Playout Software	ftp://ftp.Omneon.com/Updates/Omneon/Current/
Software for Select Electra Encoders	https://harmonic.force.com/SWAccess/SWDownloadLogin

The Harmonic Inc. corporate address is:

Harmonic Inc.
4300 North First St.
San Jose, CA 95134, U.S.A.
Attn: Customer Support

The corporate telephone numbers for Harmonic Inc. are:

Tel. 1.800.788.1330 (inside the U.S.)
Tel. +1.408.542.2500 (outside the U.S.)
Fax.+1.408.542.2511

Appendix B

Safety and Regulatory Compliance Information

Legal Disclaimer: Information in this document is provided in connection with Harmonic products. Unless otherwise agreed in writing Harmonic products are not designed nor intended for any application in which the failure of the product could cause personal injury or death.



NOTE: The information in this appendix may apply to purchased products only.

Important Safety Instructions




This section provides important safety guidelines for operators and service personnel. Specific warnings and cautions are found throughout the guide where they apply, but may not appear here. Please read and follow the important safety information, noting especially those instructions related to risk of fire, electric shock or injury to persons. You must adhere to the guidelines in this document to ensure and maintain compliance with existing product certifications and approvals. In this document, we use “product,” “equipment,” and “unit” interchangeably.

This equipment generates, uses, and can radiate radio frequency energy. It may cause harmful interference to radio communications if it is not installed and used in accordance with the instructions in this manual. Operation of this equipment in a residential area is likely to cause harmful interference. If this occurs, the user will be required to correct the interference at his or her own expense.




In event of conflict between the information in this document and information provided with the product or on our website for a particular product, this product documentation takes precedence.

Safety Symbols & Translated Safety, Warning & Caution Instructions (English)

To avoid personal injury or property damage, before you begin installing or replacing the product, read, observe, and adhere to all the following safety instructions and information. Harmonic products and/or product packaging may be marked with the safety symbols used throughout this document, when it is necessary to alert operators, users, and service providers to pertinent safety instructions in the manuals.




Mark	Notes
 Warning	Installing or Replacing the Product Unit Warning <ul style="list-style-type: none"> Only trained and qualified service personnel should be allowed to install, replace, or service this unit (refer AS/NZS 3260 Clause 1.2.14.3 Service Personnel). Read the installation instructions before connecting the system to the power source. When installing or replacing the unit, always make the ground connection first and disconnect it last. Installation of the unit must comply with local and national electrical codes. This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of special tool, lock and key or other means of security. Use only specified replacement parts. Do not use this unit in or near water. Disconnect all AC power before installing any options or servicing the unit unless instructed to do so by this manual.
 Warning	Rack Mount Warning <ul style="list-style-type: none"> To prevent bodily injury when mounting or servicing this unit in a rack, special precautions must be taken to ensure your safety and stability of system: Conform to local occupational health and safety requirements when moving and lifting the equipment. Ensure that mounting of the unit by mechanical loading tools should not induce hazardous conditions. To avoid risk of potential electric shock, a proper safety ground must be implemented for the rack and each piece of equipment installed on it.
 Warning	Chassis Warning <ul style="list-style-type: none"> Before connecting or disconnecting ground or power wires to the chassis, ensure that power is removed from the DC circuit. To prevent personal injury or damage to the chassis, lift the unit only by using handles that are an integral part of the chassis, or by holding the chassis underneath its lower edge. Any instructions in this guide that require opening the chassis or removing a board should be performed by qualified service personnel only. Slots and openings in the chassis are provided for ventilation. Do not block them. Leave the back of the frame clear for air exhaust cooling and to allow room for cabling - a minimum of 6 inches (15.24 cm) of clearance is recommended.

Mark	Notes
<div data-bbox="354 289 474 403" data-label="Image"> </div> <p data-bbox="347 485 448 516">Warning</p>	<p data-bbox="529 281 816 312">Electric Shock Warning</p> <ul style="list-style-type: none"> <li data-bbox="529 315 1458 405">■ This unit might have more than one power cord. To reduce the risk of electric shock, disconnect the two power supply cords before servicing the unit. <li data-bbox="529 409 1422 470">■ Before working on a chassis or working near power supplies, unplug the power cord on AC units. <li data-bbox="529 474 1458 535">■ Do not work on the system or connect or disconnect cables during periods of lightning activity. <li data-bbox="529 539 1458 630">■ This unit is grounded through the power cord grounding conductor. To avoid electric shock, plug the power cord into a properly wired receptacle before connecting the product input or outputs. <li data-bbox="529 634 1458 724">■ Route power cords and other cables so that they are not likely to be damaged. Disconnect power input to unit before cleaning. Do not use liquid or aerosol cleaners; use only a damp cloth to clean chassis. <li data-bbox="529 728 1458 852">■ Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed connections and components while power is on. Do not insert anything into either of the system's two power supply cavities with power connected <li data-bbox="529 856 1419 917">■ Never install an AC power module and a DC power module in the same chassis. <li data-bbox="529 921 1398 982">■ Do not wear hand jewelry or watch when troubleshooting high current circuits, such as the power supplies. <li data-bbox="529 987 1458 1077">■ To avoid fire hazard, use only the specified correct type voltage and current ratings as referenced in the appropriate parts list for this unit. Always refer fuse replacement to qualified service personnel. <li data-bbox="529 1081 1458 1205">■ This unit relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors). <li data-bbox="529 1209 1458 1299">■ To avoid electrocution ensure that the rack has been correctly grounded before switching on the unit. When removing the unit remove the grounding connection only after the unit is switched off and unplugged.
<div data-bbox="354 1333 474 1446" data-label="Image"> </div> <p data-bbox="347 1516 441 1547">Caution</p>	<p data-bbox="529 1325 995 1356">Electrostatic Discharge (ESD) Caution</p> <ul style="list-style-type: none"> <li data-bbox="529 1358 1268 1390">■ Follow static precaution at all times when handling this unit. <li data-bbox="529 1394 1451 1484">■ Always wear an ESD-preventive wrist or ankle strap when handling electronic components. Connect one end of the strap to an ESD jack or an unpainted metal component on the system <li data-bbox="529 1488 1451 1549">■ Handle cards by the faceplates and edges only; avoid touching the printed circuit board and connector pins. <li data-bbox="529 1554 1370 1614">■ Place any removed component on an antistatic surface or in a static shielding bag. <li data-bbox="529 1619 1117 1650">■ Avoid contact between the cards and clothing. <li data-bbox="529 1654 1338 1715">■ Periodically check the resistance value of the antistatic strap. Recommended value is between 1 and 10 mega-ohms (Mohms).





Mark	Notes
 Warning	Laser Radiation Warning Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments. Never operate a unit with a broken fibre or with a separated fiber connector.
 Warning	Lithium Battery Handling Safety Instructions <ul style="list-style-type: none">■ CALIFORNIA PERCHLORATE ADVISORY: Some lithium batteries may contain perchlorate material. The following advisory is provided: "Perchlorate Material - special handling may apply, see: www.dtsc.ca.gov/hazardous_waste/perchlorate/for_information".
 Caution	<ul style="list-style-type: none">■ Risk of explosion if battery is replaced incorrectly or with an incorrect type■ Dispose of used batteries according to the manufacturer's instructions■ There are no user-serviceable batteries inside Harmonic products. Refer to Harmonic qualified personnel only to service the replaceable batteries

Symboles de sécurité et traduits de sécurité, d'avertissement et Attention Instructions (français)

Pour éviter des blessures ou des dommages matériels, avant de commencer l'installation ou le remplacement du produit, lire, observer, et de respecter toutes les instructions et informations de sécurité suivantes. Produits harmoniques et / ou l'emballage du produit peuvent être marqués avec les symboles de sécurité utilisés dans le présent document, lorsque cela est nécessaire pour alerter les opérateurs, les utilisateurs et les fournisseurs de services de consignes de sécurité pertinentes dans les manuels.




Mark	Notes
 Avertissement	Installation ou remplacement de l'unité de produit Avertissement <ul style="list-style-type: none">■ Il est vivement recommandé de confier l'installation, le remplacement et la maintenance de ces équipements à des personnels qualifiés et expérimentés. (voir AS / NZS 3260 article 1.2.14.3 du personnel de service).■ Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.■ Lors de l'installation ou le remplacement de l'appareil, la mise à la terre doit toujours être connectée en premier et déconnectée en dernier.■ L'équipement doit être installé conformément aux normes électriques nationales et locales.■ Cet appareil est à installer dans des zones d'accès réservé. Ces dernières sont des zones auxquelles seul le personnel de service peut accéder en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité.■ Utilisez uniquement des pièces de rechange spécifiées.■ Ne pas utiliser ce produit dans l'eau ni à proximité de l'eau. Débrancher toutes les prises d'alimentation secteur avant d'installer des options ou d'effectuer l'entretien de l'unité, à moins d'instructions contraires dans le présent manuel.
 Avertissement	Rack Monture Avertissement <p>Pour éviter les blessures corporelles lors du montage ou l'entretien de cet appareil dans un rack, des précautions particulières doivent être prises pour assurer votre sécurité et la stabilité du système:</p> <ul style="list-style-type: none">■ Conformez-vous aux exigences de médecine du travail et de sécurité lorsque vous déplacez et soulevez le matériel.■ Assurez-vous que le montage de l'appareil par des outils de chargement mécaniques ne doit pas induire des conditions dangereuses.■ Pour éviter tout risque d'électrocution, le rack et chaque élément de l'équipement installé dans le rack doivent être correctement reliés à la terre.
 Avertissement	Châssis Avertissement <ul style="list-style-type: none">■ Avant de connecter ou de déconnecter les câbles d'alimentation (pôles et terre) du châssis, vérifiez que le circuit de courant continu est hors tension.■ Pour éviter toute blessure ou des dommages au châssis, soulevez l'unité uniquement par les poignées du châssis lui-même ou en portant celui-ci par le bord inférieur.■ Toutes les opérations du présent guide nécessitant l'ouverture du châssis ou le retrait d'une carte doivent être uniquement effectuées par du personnel d'entretien qualifié.■ Le châssis est muni de fentes et d'ouvertures d'aération. Ne pas les bloquer. Dégager l'arrière du cadre pour permettre le refroidissement de l'évacuation d'air et laisser de la place au câblage; un dégagement d'au moins 15.24 cm (6 po) est recommandé.

Mark	Notes
<div data-bbox="354 289 474 401" data-label="Image"> </div> <p data-bbox="347 485 519 512">Avertissement</p>	<p data-bbox="558 281 943 308">Choc électrique Avertissement</p> <ul style="list-style-type: none"> <li data-bbox="558 315 1414 405">■ Il est possible que cette unité soit munie de plusieurs cordons d'alimentation. Pour éviter les risques d'électrocution, débrancher les deux cordons d'alimentation avant de réparer l'unité. <li data-bbox="558 411 1425 501">■ Avant de travailler sur un châssis ou à proximité d'une alimentation électrique, débrancher le cordon d'alimentation des unités en courant alternatif. <li data-bbox="558 508 1419 564">■ Ne pas travailler sur le système ni brancher ou débrancher les câbles pendant un orage. <li data-bbox="558 571 1414 690">■ Ce unité est mis à la terre par le conducteur de protection intégré au cordon d'alimentation. Pour éviter les chocs électriques, brancher le cordon d'alimentation dans une prise correctement cable avant de raccorder les entrées ou sorties du unité. <li data-bbox="558 697 1455 819">■ Installer les cordons d'alimentation et autres cables de sorte qu'ils ne risquent pas d'être endommagés. Couper l'alimentation avant nettoyage. Ne pas utiliser de nettoyant liquide ou en aérosol; utiliser seulement un linge humide. <li data-bbox="558 825 1463 976">■ Des courants électriques dangereux circulent dans cet appareil. Afin d'éviter les lessures, ne pas toucher les connexions et composants exposés lorsque l'appareil est sous tension. Ne rien insérer dans l'une ou l'autre des cavités des prises de courant du système lorsque l'appareil est sous tension. <li data-bbox="558 982 1317 1039">■ N'installez jamais un module d'alimentation AC et un module d'alimentation DC dans le même châssis. <li data-bbox="558 1045 1463 1102">■ Ne pas porter de bijoux aux mains ni de montre durant le dépannage des circuits à haute tension, comme les transformateurs. <li data-bbox="558 1108 1463 1230">■ Pour prévenir les risques d'incendie, n'utiliser que le type, la tension et le courant nominal spécifiés dans la nomenclature des pièces de ce unité. Toujours confier le remplacement des fusibles à du personnel d'entretien qualifié. <li data-bbox="558 1236 1455 1388">■ Pour ce qui est de la protection contre les courts-circuits (surtension), ce produit dépend de l'installation électrique du local. Vérifier qu'un fusible ou qu'un disjoncteur de 120 V alt., 15 A U.S. maximum (240 V alt., 10 A international) est utilisé sur les conducteurs de phase (conducteurs de charge). <li data-bbox="558 1394 1463 1516">■ Pour éviter l'électrocution, assurez-vous que le rack a bien été mis à la terre avant de mettre l'unité en marche. Lors du retrait de l'unité, retirer le raccordement de terre seulement après avoir mis l'unité à l'arrêt et l'avoir débranchée.




Mark	Notes
 Attention	Les décharges électrostatiques (ESD) Attention <ul style="list-style-type: none"> ■ Respecter systématiquement les précautions relatives aux charges électrostatiques durant la manipulation de cet unité. ■ Portez toujours un poignet ou la cheville bracelet antistatique préventive lors de la manipulation des composants électroniques. Branchez une extrémité de la sangle à une prise ESD ou d'un composant métallique non peinte sur le système. ■ Manipulez les cartes en les faces avant et les bords seulement; éviter de toucher la carte de circuit imprimé et les broches du connecteur. ■ Placer un composant retiré sur une surface antistatique ou dans un sac de protection statique. ■ Éviter tout contact entre les cartes et les vêtements. ■ Vérifier périodiquement la valeur de résistance de la sangle antistatique. Valeur recommandée est comprise entre 1 et 10 méga-ohms (Mohms).
 Avertissement	Rayonnement laser Attention <ul style="list-style-type: none"> ■ Rayonnement laser invisible peut être émis à partir de fibres ou les connecteurs débranchés. Ne pas regarder en faisceaux ou regarder directement avec des instruments optiques. Ne jamais faire fonctionner une unité en cas de bris d'une fibre ou de séparation d'un connecteur de fibre.
 Avertissement	Batterie au lithium Manipulation instructions de sécurité <ul style="list-style-type: none"> ■ Perchlorate pour la Californie Consultatif: Certaines batteries au lithium, peuvent contenir du perchlorate. le texte qui suit consultatif est prévu: "Présence de perchlorate - une manipulation spéciale peut s'appliquer, voir: www.dtsc.ca.gov/hazardous_waste/perchlorate/for_information".
 Attention	<ul style="list-style-type: none"> ■ Il y a danger d'explosion si la batterie est remplacée de manière incorrecte ou par une batterie de type incorrect. ■ Mettre au rebut les batteries usagées conformément aux instructions du fabricant. ■ Les batteries des produits Harmonic ne peuvent pas être réparées ni entretenues par l'utilisateur. Ne confier l'entretien des batteries remplaçables qu'à du personnel compétent de Harmonic.

Sicherheit Symbole und übersetzt Sicherheit, Achtung & Vorsicht Anleitung (Deutsch)

Um Verletzungen oder Sachschäden zu vermeiden, bevor Sie mit der Installation oder Austausch des Produkts zu beginnen, zu lesen, zu beobachten, und sich an all den folgenden Sicherheitshinweise und Informationen. Harmonic Produkte und / oder Produktverpackungen können mit den Sicherheitssymbole in diesem Dokument verwendet werden, markiert, wenn es notwendig ist für die Betreiber, Anwender und Dienstleister, um relevante Sicherheitsanweisungen in den Handbüchern zu alarmieren.

Mark	Notes
 Warnung	Installation oder den Austausch des Produkts Einheit Warnung <ul style="list-style-type: none"> ■ Das Installieren, Ersetzen oder Bedienen dieser Ausrüstung sollte nur geschultem, qualifiziertem Personal gestattet werden (siehe AS / NZS 3260 Clause 1.2.14.3 Servicepersonal) ■ Lesen Sie die Installationsanweisungen, bevor Sie das System an die Stromquelle anschließen. ■ Der Erdanschluß muß bei der Installation der Einheit immer zuerst hergestellt und zuletzt abgetrennt werden. ■ Die Installation der Geräte muss den Sicherheitsstandards entsprechen. ■ Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Ein Bereich mit beschränktem Zutritt ist ein Bereich, zu dem nur Wartungspersonal mit einem Spezialwerkzeugs, Schloß und Schlüssel oder anderer Sicherheitsvorkehrungen Zugang. ■ Verwenden Sie nur die angegebenen Ersatzteile ■ Das Gerät in oder in der Nähe von Wasser verwenden. Trennen Sie vor der Installation von Optionen oder Wartung des Gerätes, es sei denn, dies wurde von diesem Handbuch alle Netz.
 Warnung	Rack-Montage-Warnung Zur Vermeidung von Körperverletzung beim Anbringen oder Warten dieser Einheit in einem Gestell müssen Sie besondere Vorkehrungen treffen, um sicherzustellen, daß das System stabil bleibt: <ul style="list-style-type: none"> ■ Entsprechen den lokalen Arbeitsschutzanforderungen beim Bewegen und Heben der Ausrüstung. ■ Stellen Sie sicher, dass die Montage des Gerätes durch mechanische Belastung Werkzeuge sollten nicht gefährlichen Bedingungen zu induzieren. ■ Um das Risiko von möglichen elektrischen Schlag zu vermeiden, muss mit einer angemessenen Erdung für Rack und jedes Gerät installiert ist implementiert werden.
 Warnung	Chassis Warnung <ul style="list-style-type: none"> ■ Gleichstrom-Unterbrechung Bevor Sie Erdungs- oder Stromkabel an das Chassis anschließen oder von ihm abtrennen, ist sicherzustellen, daß der Gleichstrom-Stromkreis unterbrochen ist. ■ Um Verletzungen und Beschädigung des Chassis zu vermeiden, sollten Sie das Chassis nicht an den Henkeln auf den Elementen (wie z.B. Stromanschlüsse, Kühlungen oder Karten) heben oder kippen; oder indem Sie es unterhalb der Unterkante packen. ■ Alle Hinweise in diesem Handbuch, die das Öffnen benötigen Sie das Gehäuse oder das Entfernen eines Board sollte nur von qualifiziertem Fachpersonal durchgeführt werden. ■ Für Schlitze und Öffnungen im Chassis vorgesehen. Blockieren Sie sie nicht. Lassen Sie die Rückseite des Rahmens frei für Abluftkühlung und um Platz für die Verkabelung ermöglichen - ein Minimum von 6 Zoll (15,24 cm) Abstand wird empfohlen

Mark	Notes
<div data-bbox="354 289 474 403" data-label="Image"> </div> <p data-bbox="347 487 454 516">Warnung</p>	<p data-bbox="522 281 818 310">Elektroschock-Warnung</p> <ul style="list-style-type: none"> <li data-bbox="522 315 1461 407">■ Diese Einheit hat möglicherweise mehr als ein Netzkabel. Zur Verringerung der Stromschlaggefahr trennen Sie beide Netzgerätekabel ab, bevor Sie die Einheit warten. <li data-bbox="522 411 1455 470">■ Vor der Arbeit an einem Chassis für Arbeiten in der Nähe Stromversorgung, ziehen Sie das Netzkabel mit Netzeinheiten. <li data-bbox="522 474 1461 533">■ Arbeiten Sie nicht am System und schließen Sie keine Kabel an bzw. trennen Sie keine ab, wenn es gewittert. <li data-bbox="522 537 1419 630">■ Dieses Gerät ist über das Netzkabel Erdungsleiter geerdet. Um einen Stromschlag zu vermeiden, stecken Sie das Netzkabel in eine Steckdose richtig verdrahtet, bevor Sie das Produkt Eingang oder Ausgänge. <li data-bbox="522 634 1461 756">■ Verlegen Sie Netzkabel und andere Kabel, so dass sie wahrscheinlich nicht beschädigt werden. Trennen Eingangsleistung Einheit vor der Reinigung. Verwenden Sie keine flüssigen oder Aerosolreiniger; nur mit einem feuchten Tuch zu reinigen Chassis. <li data-bbox="522 760 1455 915">■ Gefährliche Spannungen vorhanden sind an mehreren Stellen in diesem Produkt. Um Verletzungen zu vermeiden, berühren Sie nicht freiliegenden Anschlüsse und Komponenten während schaltet ist. Sie keine Gegenstände in einem der beiden Stromversorgungs Hohlräume des Systems mit Strom verbunden einführen. <li data-bbox="522 919 1380 978">■ Ein Wechselstrommodul und ein Gleichstrommodul dürfen niemals in demselben Chassis installiert werden. <li data-bbox="522 982 1399 1041">■ Tragen Sie keine Hand Schmuck oder schauen Sie bei der Fehlersuche hohen Stromkreise, wie beispielsweise die Stromversorgung. <li data-bbox="522 1045 1435 1167">■ Um die Brandgefahr zu vermeiden, verwenden Sie nur den genannten richtige Art von Spannung und Strom Ratings als in der entsprechenden Stückliste für diese Einheit verwiesen. Beziehen sich immer auf Austausch der Sicherung von qualifiziertem Fachpersonal. <li data-bbox="522 1171 1461 1327">■ Dieses Produkt ist darauf angewiesen, daß im Gebäude ein Kurzschluß- bzw. Überstromschutz installiert ist. Stellen Sie sicher, daß eine Sicherung oder ein Unterbrecher von nicht mehr als 240 V Wechselstrom, 10 A (bzw. in den USA 120 V Wechselstrom, 15 A) an den Phasenleitern (allen stromführenden Leitern) verwendet wird. <li data-bbox="522 1331 1461 1453">■ Um einen Stromschlag zu vermeiden, sicherzustellen, dass die Zahnstange wurde korrekt vor dem Einschalten des Gerätes geerdet. Beim Entfernen der Einheit entfernen Sie die Masseverbindung nur, nachdem das Gerät ausgeschaltet und der Netzstecker gezogen.
<div data-bbox="354 1486 474 1600" data-label="Image"> </div> <p data-bbox="347 1684 438 1713">Vorsicht</p>	<p data-bbox="522 1478 1039 1507">Elektrostatische Entladung (ESD) Vorsicht</p> <ul style="list-style-type: none"> <li data-bbox="522 1512 1403 1570">■ Folgen Sie statische vorsorglich zu jeder Zeit beim Umgang mit diesem Gerät. <li data-bbox="522 1575 1461 1696">■ Tragen Sie immer einen ESD-präventive Handgelenk oder Knöchel-Riemen beim Umgang mit elektronischen Komponenten. Schließen Sie ein Ende des Bandes an einem ESD-Buchse oder ein unlackiertes Metallteil auf dem System. <li data-bbox="522 1701 1367 1759">■ Hand Karten nur durch die Faceplates und Kanten; Berühren Sie die bedruckte Leiterplatte und Steckerstifte. <li data-bbox="522 1764 1429 1822">■ Legen Sie alle entfernten Komponenten auf eine antistatische Oberfläche oder in einem Statik-Beutel. <li data-bbox="522 1827 1211 1856">■ Kontakt zwischen den Karten und Kleidung vermeiden. <li data-bbox="522 1860 1455 1919">■ Den Widerstandswert der gegen statische Gurt in regelmäßigen Abständen überprüfen. Empfohlener Wert ist zwischen 1 und 10 Mega-Ohm (MOhm).

Mark	Notes
 Warnung	Laserstrahlungen Warnung. Unsichtbare Laserstrahlung kann von getrennten Fasern oder Stecker emittiert werden. Nicht in die Strahlen blicken oder direkt mit optischen Instrumenten. Niemals ein Gerät mit einem gebrochenen Faser oder mit einem Glasfaseranschluss getrennt.
 Warnung	Lithium-Batterie Handhabung Sicherheitshinweise CALIFORNIA PERCHLORATE ADVISORY: Einige Lithium-Batterien kann Perchlorat enthalten. Die folgende Beratungs gesetzt: "Perchlorat - Sonderbehandlung kann erforderlich sein, finden Sie unter: www.dtsc.ca.gov/hazardous_waste/perchlorate/ for information ".
 Vorsich	<ul style="list-style-type: none"> ■ Bei Einsetzen einer falschen Batterie besteht Explosionsgefahr ■ Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers. ■ Es gibt keine zu wartenden Akkus im Harmonic Produkte. Siehe Harmonic qualifiziertes Personal, um die austauschbare Batterien Service

Site Preparation Instructions



NOTE: Only trained and qualified service personnel (as defined in IEC 60950 and AS/NZS 3260) should install, replace, or service the equipment. Install the system in accordance with the U.S. National Electric Code if you are in the United States.

1. Preparing & Choosing a Site for Installation
 - ❑ To ensure normal system operation, plan your site configuration and prepare the site before installation.
 - ❑ Install the unit in a restricted access area.
 - ❑ Choose a site with a dry, clean, well-ventilated and air-conditioned area.
 - ❑ Choose a site that maintains an ambient temperature of 32 to 104°F (0 to 40°C)
2. Creating a Safe Environment
 - ❑ Connect AC-powered systems to grounded power outlets or as per local regulations.
 - ❑ Do not move or ship equipment unless it is correctly packed in its original wrapping and shipping containers.
 - ❑ Only allow Harmonic trained personnel to undertake equipment service and maintenance. Do not permit unqualified personnel to operate the unit.
 - ❑ Wear ear protection when working near an NSG Pro platform for a longer period of time.
3. Rack Mounting the Unit
 - ❑ Install the system in an open rack whenever possible. If installation in an enclosed rack is unavoidable, ensure that the rack has adequate ventilation.

- ❑ Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips). This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
 - ❑ When mounting this unit in the partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
 - ❑ If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.
 - ❑ The rack must be anchored to an immovable support to prevent it from tipping when the unit is mounted on it. The rack must be installed according to the rack manufacturer's instructions.
 - ❑ Disconnect all power and external cables before lifting the unit. Depending on the weight of the unit, more than one person might be required to lift it.
4. Power Considerations
- a. AC Power
 - ❑ Adding to the system a UPS (Uninterrupted Power Supply) and an AVR (Automated Voltage Regulator) is highly recommended.
 - ❑ Installing the main power supply by a qualified electrician, according to power authority regulations. Make sure all powering are wired with an earth leakage, according to local regulations.
 - ❑ It is recommended to install the encoder within 1.5m (approximately 5 feet) from an easily accessible grounded AC outlet.
 - ❑ When the encoder is rack-mounted, ensure that the rack is correctly grounded.
 - b. DC Power
 - ❑ Ensure a suitable overcurrent device is in-line between the equipment and the power source.
 - ❑ Connect DC-input power supplies only to a DC power source that complies with the safety extra-low voltage (SELV) requirements in the UL60950-1, CAN/CSA-C22.2 No. 60950-1-03, AS/NZS 60950-1, EN/IEC 60825-1, 21 CFR 1040, EN 60950-1, and IEC 60950-1 standards.
 - ❑ Ensure that power is removed from the DC circuit before installing or removing power supplies
5. Handling Fiber Channel Cables
- ❑ Always read and comply with the handling instructions on the shipping container.
 - ❑ Follow all ESD precautions and approved fiber cleaning procedures.
 - ❑ The fiber is made of a very pure, expensive glass and should be treated with great care. Handle fibers only in areas that are very clean and do not contain sharp objects.
 - ❑ Wear finger cots or gloves as dirt and oils can damage the fiber and contaminate connectors.
 - ❑ Do not allow kinks or knots to develop in the fiber. If tangles occur, carefully work out the tangles avoiding pulling or bending the fibre beyond its bend radius.
 - ❑ Always use the correct tools for stripping and cleaving the fiber. It will save time and reduce breakage caused by scratches.
 - ❑ If you must secure a bundle of fiber cables together, avoid plastic and metal tie wraps; secure with velcro instead.
6. Disposing of the Unit
- ❑ Dispose of the unit and its components (including batteries) as specified by all national laws and regulations.

Product End-of-Life Disassembly Instructions

For disassembly instructions, please call the technical support in order to remove components requiring selective treatment, as defined by the EU WEEE Directive (2012/19/EU). See Contacting the [Technical Assistance Center](#).

Product Disassembly Process

1. Disassemble equipment at a dedicated area only, gather the needed tools for disassembly.
2. Remove covers, housing, etc.
3. Remove and separate sub-assemblies (i.e. cables, metals, displays, fans, etc.).
4. Separate hazardous materials from the remainder of the material.
 - a. Sort hazardous materials into their different types (i.e., batteries, hazardous liquids, hazardous solids, fiberglass, etc.).
 - b. Proceed with hazardous waste management processes only.
5. Identify re-usable materials/sub-assemblies and separate these from the rest of the material.
6. Identify and separate recyclable materials as per below examples:
 - a. Scrap material to be sent to smelter(s).
 - b. E-waste such as displays, CPU's, cables and wires, hard drives, keyboards, etc.
 - c. Metals such as steel, brass, and aluminum.
 - d. Plastics such as fan casings, housings, covers, etc.
 - e. Fiber optics and plastic tubing not containing electrical or data wiring.

Safety Rules (English)

Recycler personnel are to wear personal protective equipment including proper eye protection, proper hand protection, and proper breathing protection if needed.

Recycler personnel shall be experienced with using the proper tools required for disassembling equipment. Untrained personnel shall not disassemble Harmonic products. Unfamiliarity with tools can cause damage and injury.

Règles de sécurité (French)

Le personnel du recycleur doit porter de l'équipement de protection individuelle, y compris des lunettes, des gants et un masque de protection appropriés au besoin.

Le personnel du recycleur doit avoir de l'expérience des outils de démontage de l'appareil. Les produits Harmonic ne doivent pas être démontés par du personnel non qualifié. Une mauvaise connaissance des outils peut causer des dommages et des blessures.

EU Manufacturer's Declaration of Conformity

This equipment is in compliance with the essential requirements and other provisions of Directives 73/23/EEC and 89/336/EEC as amended by Directive 93/68/EEC.



NOTE: For specifics, about which standards have been applied, refer to the Declaration of Conformity of the product on Harmonic website at [Product Regulatory Compliance](#) or contact Harmonic Compliance Team at regulatory.compliance@harmonicinc.com

Electromagnetic Compatibility Notices – Class A

a. FCC Verification Statement (USA)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.

Connections between the Harmonic equipment and other equipment must be made in a manner that is consistent with maintaining compliance with FCC radio frequency emission limits. Modifications to this equipment not expressly approved by Harmonic may void the authority granted to the user by the FCC to operate this equipment and you may be required to correct any interference to radio or television communications at your own expense.

b. ICES-003 Statement (Canada)

English: This Class A digital apparatus complies with Canadian ICES-003.

French: Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

c. CE Declaration of Conformity (European Union)

This product has been tested in accordance too, and complies with the Low Voltage Directive (2014/30/EU) and EMC Directive (2014/35/EU). The product has been marked with the CE Mark to illustrate its compliance.

d. VCCI Class A Warning (Japan)

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

English translation of the notice above:

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI) from Information Technology Equipment. If this equipment is used in a domestic environment, it may cause radio interference. When such trouble occurs, the user may be required to take corrective actions.

e. BSMI EMC Notice (Taiwan)

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，
可能會造成射頻干擾，在這種情況下，使用者會
被要求採取某些適當的對策

English translation of the notice above:

This is a Class A Information Product, when used in residential environment, it may cause radio frequency interference, under such circumstances, the user may be requested to take appropriate counter measures.

f. Class A Warning (Korea)

주의 A급 기기 이 기기는 업무용으로 전자파 적합 등록을 한 기기이
오니 판매자 또는 사용자는 이 점을 주의하시기 바라며 만약
잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

English translation of the notice above:

This is a Class A device and is registered for EMC requirements for industrial use. The seller or buyer should be aware of this. If this was sold or purchased by mistake, it should be replaced with a residential-use type.

g. Class A Statement (China)

中华人民共和国“A类”警告声明

声 明
此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，
可能需要用户对其干扰采取切实可行的措施。

English translation of the notice above:

When labeled with the CCC marking, the product meets the applicable safety and EMC requirements for China. This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

h. Class A Warning – CISPR 22 (AS/NZS)

Warning (English)

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Attention (French)

Il s'agit d'un produit de classe A. Dans un environnement local, ce produit peut entraîner des perturbations radioélectriques, auquel cas l'utilisateur devra éventuellement prendre des mesures adéquates.

Product Regulatory Compliance

Harmonic products are typically tested to the latest safety and electromagnetic compatibility (EMC) specifications and test methods, and are marked with one or more of the following regulatory/certification markings. Some of the certification markings will vary depending on what certifier was used to obtain a certification.

Please visit Harmonic [Product Regulatory Compliance](#) page to view information on applied safety & EMC standards and regulatory marks on Harmonic products. You can also email us at regulatory.compliance@harmonicinc.com for assistance on regulatory compliance for Harmonic products.

Product Regulatory Compliance Markings

Table B-1: Regulatory Compliance Markings

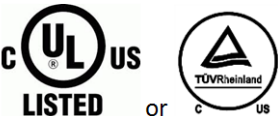








Country/ Region	Testing Standard/ Specification	Certification Type	Regulatory Mark Name	Product Marketing
USA/ Canada	EN 60950-1:2006+A11:2009+A1:2010+A12:2011; CAN/CSA C22.2 No. 60950-1-07+A1:2011/UL 60950-1:2011	Safety	NRTL (National Recognized Test Laboratory)	
USA/ Canada	FCC CFR 47 Part 15, Class A ICES-003: Issue 5, 2012; Class A	EMC	FCC Class A Statement	<div> <p>This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.</p> </div>
European Union	RoHS: EN 50581:2012; EN55022:2010/ CISPR 22:2008; EN55024:2010/ CISPR 24:2010; EN61000-3-2:2006+A1:2009+A2:2009; EN61000-3-3:2008; Class A	Safety and EMC	CE / Low Voltage Directive	
Germany	EN 60950-1; EN60825-1 (for laser)	Safety	GS	

Table B-1: Regulatory Compliance Markings

Country/ Region	Testing Standard/ Specification	Certification Type	Regulatory Mark Name	Product Marketing
Mexico	NOM-019-SCFI-1998	Safety	NOM	
Taiwan	CNS 14336-1:2010 CNS 13438:2006; Class A	Safety and EMC	BSMI Certification (RPC) Number & Class A Warning	 警告使用者： 這是甲類的資訊產品，在居住的環境中使用 時，可能會造成射頻干擾，在這種情況下， 使用者會被要求採取某些適當的對策。
Japan	VCCI V-3/2013.04; CISPR 22:2008, Class A	EMC	VCCI	
Australia and New Zealand	AS/NZS CISPR22:2009+A1:2 010; Class A	Safety	C-Tick	 NXXXXX
Korea	KN22 Class A and KN 24	EMC	KC	
China	GB4943.1-2011 GB9254-2008 GB17625.1-2012	Safety and EMC	CCC	
India	IS 13252 (Part 1): 2010	Safety	BIS Compulsory Registration	"Self Declaration - Conforming to IS 13252 (Part 1):2010, R- XXXXXXXXX"

Product Environmental Compliance

Harmonic manufactures high quality and innovative IT and telecommunications equipment, video delivery infrastructure solutions and services for its customers worldwide. Harmonic is committed to providing our customers with safe and environmentally friendly products that are compliant with all relevant regulations, customer specifications, and environmental legislation, including the directives described below.

EU RoHS

In July 2006, the European Union's (EU) Directive (2002/95/EC) on the Restriction of the use of certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment (EEE) went into effect, and in July, 2011, the European Union's RoHS Recast Directive (2011/65/EU) also known as RoHS II entered into force.

Harmonic understands the environmental risks associated with the substances covered by the RoHS Directive and has committed to eliminating or reducing the use of these, as well as other environmentally sensitive substances in our products. Harmonic also continues to comply with the requirements under RoHS II.

For more information, please visit EU RoHS directive page at official EU website.

http://ec.europa.eu/environment/waste/rohs_eee/legis_en.htm

Restricted Substance Statement

Harmonic products contain less than the permitted limits for the six restricted substances except where exemptions published in the RoHS2 Directive are applicable. This statement is based on vendor-supplied analysis or material certifications, and/or lab test results of the component raw materials used in the manufacture of Harmonic products.

Table B-2:Restricted Substances

Restricted Substance	Permitted Limit*
Cadmium (Cd)	$\leq 0.01\%$
Lead (Pb)	$\leq 0.1\%$
Chromium (VI) (Cr (VI))	$\leq 0.1\%$
Mercury (Hg)	$\leq 0.1\%$
Polybrominated biphenyls (PBBs)	$\leq 0.1\%$
Polybrominated diphenyl ether (PBDE)	$\leq 0.1\%$
*Homogeneous material definition as per the EU Directive.	

EU REACH

REACH (Registration, Evaluation, Authorization and restriction of Chemicals) (EC 1907/2006) is a European Union's regulation on chemicals and their safe use which came into force in June, 2007.

Harmonic supports the basic aim of REACH in improving the protection of human health and environment through the better and earlier identification of intrinsic properties of chemical substances. Harmonic products are considered "articles" under REACH; therefore, we are required to provide recipients of our products with information on Substance of Very High Concern (SVHC) present in concentration above 0.1% (w/w).

Substances in our products are not intended to be released under normal or reasonably foreseeable conditions of use; therefore, the registration requirement in REACH Article 7(1) does not apply to our products.

For more information, please visit REACH regulation page at official EU website.

http://ec.europa.eu/environment/chemicals/reach/reach_en.htm

China RoHS

China's regulation on restriction of the use of certain hazardous substances commonly (China RoHS), is applicable to all Electronic and Information Products (EIPs) and parts sold in China after March 01, 2007. China RoHS regulation restricts the use of the same six substances as the European Union's ROHS, but has requirements for product labeling and regulated substance information disclosure.

Harmonic complies with China RoHS Phase I for labeling and information disclosure requirements and continues to monitor new developments in China RoHS Phase II towards substance restriction and certification program.

For more information, please visit China RoHS regulation page at official US export website.

<http://www.export.gov/china/doingbizinchina/>

China RoHS Disclosure Report

Below table shows the presence of hazardous substances, or elements in Harmonic products, if the part is present.

该表显示哈雷公司产品中可能含有的有毒有害物质元配件的信息，除了来源于元配件供应商的物料成分资料，亦来自其它相关的机构与资料。哈雷产品不一定使用这些元配件。

This table shows those components where hazardous substances may be found in Harmonic products based on, among other things, material content information provided by third party suppliers. These components may or may not be part of the product.

除非特殊注明，哈雷公司产品的环保使用期限 均为 20 年。该环保使用期限的有效条件为：必须遵循该产品使用手册的规定，对该产品进行使用或存储。

The Environmental Protective Use Period for Harmonic products is 20 years unless displayed otherwise on the product. The EPUP period is valid only when the products are operated or stored as per the conditions specified in the product manual.

部件名称 (Part name)	有毒有害物质或元素 (Hazardous Substance)					
	铅	汞 (Hg)	镉 (Cd)	六价铬 (CrVI)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷线路板 (Printed Circuit Assemblies)	X	O	O	O	O	O
机械组件 (Mechanical Subassemblies)	X	O	O	O	O	O
光学组件 (Optical Subassemblies)	X	O	O	O	O	O
电源 (Power Supplies)	X	O	O	O	O	O
缆线 / 线束 (Cables, harnesses)	X	O	O	O	O	O
屏幕 / 显示器 (Screens, Monitors)	X	O	O	O	O	O
金属零件 (Metal Parts)	X	O	O	O	O	O
塑料 / 发泡材料 (Plastics, foams)	O	O	O	O	O	O
电池 (Batteries)	O	O	O	O	O	O

O: 表示在该部件的所有均质材料中，此类有毒有害物质的含量均小于 SJ/T11363-2006 标准所规定的限量。

O: Indicates the content of the toxic and hazardous substances at the homogeneous material level of the parts is below the limit defined in SJ/T11363 2006 standard.

X: 表示至少在该部件的某一均质材料中，此类有毒有害物质的含量超出 SJ/T11363-2006 标准规定的限量。

X: Indicates that the content of the toxic and hazardous substances in at least one of the homogeneous materials of the parts is above the limit defined in SJ/T11363 2006 standard.

Other RoHS and REACH type Regulations

Harmonic will comply with RoHS and REACH type regulations evolving in other countries, if they become relevant to our products or in markets where we sell our products.

Waste Electrical and Electronic Equipment (WEEE)

European Parliament and the Council of the European Union's WEEE Directive (2002/96/EC) came into force on August, 2005 and, were more recently amended in July, 2012. This directive encourages the reuse, recycling, and recovery of WEEE and to improve the environmental performance of all operators involved in the life cycle of electrical and electronic equipment, especially those dealing with WEEE. Harmonic ensures that all requirements for registration, reporting, design and data tracking are complied with to meet the objectives of the WEEE directive.

For more information, please visit WEEE directive page at official EU website.

http://ec.europa.eu/environment/waste/wEEE/legis_en.htm

Battery Directive

In September 2006, the European Union's Directive 2006/66/EC (Battery Directive) came into force with an aim to prohibit the sale of batteries and accumulators containing hazardous substances and to set rules and promote collection, treatment, recycling and disposal of waste batteries and accumulators. This directive applies to spent batteries collected together with WEEE and requires their removal and separate collection. Once removed from WEEE, spent batteries are governed by the Battery Directive. Harmonic uses lithium batteries in its products and our responsibility under the Battery Directive is taken care of under our WEEE Take-Back program.

For more information, please visit Batteries and Accumulators directive page at official EU website.

<http://ec.europa.eu/environment/waste/batteries/>

Harmonic is committed to manufacturing environmentally safe products for the community, and will make reasonable efforts and required adjustments to its practices, if necessary, to comply with various environmental directives and industry initiatives on the elimination of hazardous substances, labeling, marking, certification and registration as required in markets where we sell our products.

Download Harmonic's Environmental Compliance Statement at the following location:

<http://www.harmonicinc.com/sites/default/files/Environmental%20Compliance%20Statement.pdf>

WEEE Take-Back Request Program

In order to assist EU member states to preserve, protect and improve the quality of the environment, protect human health and utilize natural resources prudently and rationally, Harmonic strives to recycle in compliance with the WEEE Directive any of its products that cannot be re-used.

Harmonic's customers should:

- Not discard equipment in household or office garbage
- Arrange proper recycling of unneeded equipment. For the take-back of Harmonic equipment, customers must:
 - Collect the information required to complete Harmonic's WEEE Take-Back Request form

- ❑ Complete and submit the online WEEE Take-Back Request form. Please note that forms must be fully completed in order to prevent process delays
- ❑ Receive instant online confirmation indicating the reference number
- ❑ Receive the End of Life (EOL) asset return authorization number and instruction for EOL asset return
- Not ship EOL product to Harmonic without a Harmonic-provided EOL asset return authorization number

The crossed-out wheeled bin symbol on a Harmonic-branded commercial product indicates that the product should not be disposed of along with municipal waste, but invites our customers to return the product to us under Harmonic's WEEE Take-Back program for product disposal.



Harmonic will pay for the cost of shipping and will provide a Certificate of Recycling or a Certificate of Destruction upon request. For more information on collection, reuse and recycling or to initiate the WEEE take-back process, please complete the form at <http://www.harmonicinc.com/webform/weee-takeback-request> or contact [Harmonic Technical Assistance Center \(TAC\)](#) or email RMA team at rma.emea@harmonicinc.com.

Compliance with additional country specific environmental, safety, and EMC standards

In addition to above listed standards and compliance regulations, Harmonic products may also be compliant with other country specific environmental, safety and EMC requirements. Please contact Harmonic Compliance Team at regulatory.compliance@harmonicinc.com or your local sales representative for more information about compliance with particular country or standard.

Appendix C

Standard ES Types and Descriptors

Standard Elementary Stream (ES) Types

The following standards are used to define types of elementary stream:

Table C–1: Elementary stream types

Value	Description
0x0	ITU-T ISO/IEC Reserved
0x1	ISO/IEC 11172 Video
0x2	ITU-T Rec. H.262 ISO/IEC 13818-2 Video or ISO/IEC 11172-2 constrained parameter video stream
0x3	ISO/IEC 11172 Audio
0x4	ISO/IEC 13818-3 Audio
0x5	ITU-T Rec. H.222.0 ISO/IEC 13818-1 private_sections
0x6	ITU-T Rec. H.222.0 ISO/IEC 13818-1 PES packets containing private data
0x7	ISO/IEC 13522 MHEG
0x8	ITU-T Rec. H.222.0 ISO/IEC 13818-1 Annex A DSM CC
0x9	ITU-T Rec. H.222.1
0xA	ISO/IEC 13818-6 type A
0xB	ISO/IEC 13818-6 type B
0xC	ISO/IEC 13818-6 type C
0xD	ISO/IEC 13818-6 type D
0xE	ISO/IEC 13818-1 auxiliary
0xF - 0x7F	ITU-T Rec. H.222.0 ISO/IEC 13818-1 Reserved
0x80 - 0xFF	User Private

Standard ES and Program Descriptors (MPEG)

The following MPEG standards are used to extend the definitions of elementary stream and programs:

Value	Description
0x2	Video stream descriptor
0x3	audio stream descriptor
0x4	hierarchy descriptor

Value	Description
0x5	registration descriptor
0x6	data stream alignment descriptor
0x7	target background grid descriptor
0x8	video window descriptor
0x9	CA descriptor
0xA	ISO 639 descriptor
0xB	system clock descriptor
0xC	multiplex buffer utilization descriptor
0xD	copyright descriptor
0xF	private data indicator descriptor
0x10	smoothing buffer descriptor
0x12	IBP descriptor

Standard ES and Program Descriptors (DVB)

The following DVB standards are used to extend the definitions of elementary stream and programs:

Value	Description
0x51	Mosaic descriptor
0x52	Stream identifier descriptor
0x56	Teletext descriptor
0x59	Subtitling descriptor
0x5F	Private data specifier
0x60	Service move descriptor
0x65	CA system descriptor
0x66	Data broadcast ID descriptor

